



State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Office of the Governor

PUBLIC LANDS POLICY COORDINATION

JOHN HARJA
Director

January 3, 2008

Selma Sierra
State Office Director
Bureau of Land Management
440 West 200 South, Suite 500
Salt Lake City, Utah 84101

SUBJECT: Vernal Field Office Supplement to the Draft Resource Management Plan and
Environmental Impact Statement (October 2007)

Dear Director Sierra:

The State of Utah appreciates the opportunity to work with the Bureau of Land Management as a formal cooperating agency in the preparation of Resource Management Plans and other environmental documentation throughout the state. The state also appreciates the BLM extending similar status to local governmental entities which have a stake in the planning area under consideration. The state firmly believes that cooperative discussions among the various landowners and regulatory agencies will lead to the best possible final product.

The state, local governments and BLM have invested considerable time and effort working together in these planning efforts. The state's expectation is that this process will lead to a well-reasoned and well-formulated plan. An important part of this process will be ensuring that the plan is consistent with state and local plans, policies, and laws, to the maximum extent possible. The plan will then, in turn, represent a reasonable compromise on the various facets of multiple-use management.

The Public Lands Policy Coordination Office (PLPCO) is tasked by state law to ensure that the positions of the state and its political subdivisions are considered in the development of public lands policy. To this end, PLPCO collected, reviewed and coordinated input from various state agencies, shared this information with local government, sought local government response, and prepared this response on behalf of the state. While the state considered local government input during preparation of its comments, the BLM should also give full consideration to the comments submitted directly by local governments.

Initially, the state wishes to recognize and applaud the partnership it has with the BLM on many issues. The restoration and watershed improvement work funded and implemented through the Utah Partners for Conservation and Development is a good example of the

achievements possible when agencies work for the improved health of the lands and resources. We are optimistic that similar efforts regarding topics such as cultural resources and air quality will be as successful.

The comments and concerns raised below are offered in the spirit of cooperation through disclosure, analysis and adherence to the provisions of law, regulation, good governance and common sense. The state recognizes planning as a dynamic process that will continue into the future, and reserves the right to supplement these comments as necessary. The state looks forward to resolution of these issues as a cooperating agency through the preparation of the Final EIS and Final Resource Management Plan.

The State of Utah commented on the 2005 Vernal Field Office Draft Resource Management Plan and Environmental Impact Statement (DEIS). Many of the state's prior comments address BLM's approach to assessing impacts associated with various resource uses. In most cases, BLM applied the same analytical approach in preparing the DEIS and the September 2007 Supplement to the Vernal Field Office Draft Resource Management Plan/Environmental Impact Statement for Non-WSA Lands with Wilderness Characteristics (2007 Supplement). Our previous comments are hereby incorporated by reference.

Economic Studies:

The state, through PLPCO, contracted with Utah State University and the University of Utah to complete a number of economic and social-attitude studies regarding the use of and values attributed to public land resources by Utah residents. These studies assess: general attitudes of the citizens toward the public lands, off-highway vehicle use on public lands, grazing on public lands, potential Wild and Scenic River designation, and economic impacts of oil and gas exploration and production. Below are short summaries of a number of these studies which are works-in-progress. We will provide copies of these studies as they are completed and ask that you consider this information as you prepare the Final RMP and Final EIS.

A statewide survey of the residents of Utah, the *Utah Public Lands Study*, was conducted in the summer of 2007 by Utah State University. One focus of the survey involved assessing various ways in which residents engage in economic activities that are linked to public lands and resources. Other major purposes involved assessing attitudes toward public lands as part of the residents' quality of life and sense of community, and assessing attitudes and preferences regarding public land management. A preliminary and partial tabulation of results for Daggett, Duchesne, and Uintah Counties is attached as "Attachment B." A more complete tabulation and analysis of results for these counties, as well as statewide results, will be submitted to BLM as they are completed.

Preliminary results from the *Utah Recreational Off-Highway Vehicle Use Study* conducted by Utah State University show OHV use becoming increasingly popular, but the number of trips taken per year declining. Recreational activities that OHV users participate in are diverse, including both passive (sightseeing and photography) and active (camping and hiking). Rider motivation includes stress relief and nature appreciation, along with achievement,

stimulation, independence and socialization with others. The study also shows economic impacts broken out by direct and total impact to Duchesne, Uintah and Daggett counties as well as by regional gross output, employment, household income, and value-added income. A "Random Utility Model" will be used to measure change in the allocation of trips across counties, measure change in the total number of trips taken by Utah OHV users, measure change in economic value accruing to OHV users and generate trip-distribution information for use in economic impact modeling. Full results will be made available upon completion of the study.

The Utah State University study, *Trend Information for the Vernal RMP: Livestock Industry Issues* indicates that the trend in livestock grazing preference and authorized use in the Vernal Field Office Planning Area is downward. The permitted AUM level proposed in the Draft RMP Preferred Alternative is a reduction of 8,323 AUMs, a 5.7 percent reduction in preference from the current level. This reflects a reduction of 15,376 AUMs, (10 percent) from the level 16 years ago. Portions of this study are attached as "Attachment C."

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Uinta Basin titled *The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry: Phase I - the Uinta Basin*. The Phase I study shows that rapidly rising energy prices and the corresponding rise in oil and gas activity are causing an economic boom in the Uinta Basin. During 2006, the oil and gas exploration and production industry was directly responsible for 19.9 percent of employment and 34.8 percent of total wages in the Uinta Basin, while those figures rose to 49.1 percent of the employment and 60 percent of the wages in the Basin when the indirect (multiplier) effects were considered. The industry also has a sizeable fiscal impact on local governments in the Uinta Basin. Property taxes paid on producing oil and gas wells were \$18.2 million in 2006 and accounted for 38.7 percent of all property taxes paid in the two counties. The Phase I study is attached as "Attachment D," and the Phase II study, concerning Carbon and Emery Counties, is attached as "Attachment E" for your consideration.

Energy Permitting and Efficiency:

The Utah Legislature in 2006 adopted an energy policy requiring a streamlined permitting process to expedite issuance of permits for energy-related projects. Utah has a process to perform this function through its Department of Environmental Quality. The Vernal BLM Office should commit to utilizing this established process in the review of such applications.

Energy efficiency is a concept that was endorsed by the State of Utah through the issuance of a Governor's Executive Order in April 2006. One of the goals was to achieve a twenty percent efficiency increase by the year 2015. The state requests BLM commit to either work toward this goal, or start coordinating alternative energy efficiency increases with the Governor's Energy Advisor.

Air Quality:

The State of Utah reiterates and incorporates by reference its prior comments on Air Quality analyses within the 2005 DEIS, and adds the following:

The state is concerned about air quality, and has been delegated primacy in the air quality program pursuant to the terms of the Clean Air Act. State concerns are set against a backdrop of an upward trend in ozone (O₃) and particulate levels in rural parts of the State. In addition, in 2006 the Environmental Protection Agency revised National Ambient Air Quality Standards (NAAQS) for small particulates (PM_{2.5}), and has recently proposed revisions to the NAAQS for ozone. These factors suggest proactive efforts between the state and the BLM begin now. As part of these efforts, the state suggests adopting both interim measures and initiating a coordinated approach to assessing and protecting air quality in Utah after the adoption of the Final Vernal RMP. This coordinated approach would include installation of further monitoring stations, collection of further baseline data, and creation of robust modeling programs for analysis of future project proposals.

As an interim measure, the state encourages the BLM Vernal Field Office to request that operators apply best available control technology. We also encourage the BLM Vernal Field Office to adopt emission standards for compressor engines consistent with the *Four Corners Air Quality Task Force Report of Mitigation Options, DRAFT: Version 7*, June 22, 2007 (Task Force Report). The BLM Farmington Field Office, San Juan Service Center, and San Juan National Forest impose the Task Force's suggested standards as conditions of approval. These standards are 2 g/bhp-hr for engines less than 300 HP and 1 g/bhp-hr for engines over 300 HP. The state encourages the BLM Vernal Field Office to impose these emission standards as lease conditions for all new and relocated engines, and as conditions of approval for all new APDs. These standards would positively impact air quality, facilitate continued action, and would be consistent with neighboring state jurisdictions.

For the future, the state encourages all agencies - federal, state, and local - to collaboratively identify and address air quality-related concerns. The state encourages these stakeholders to come together through an entity such as the Natural Resources Coordinating Council (NRCC), to develop more comprehensive analyses and region-wide modeling, and to assess the impacts of plan-based decisions on air quality in Utah. Pending completion of comprehensive air quality analyses and region-wide air quality modeling, we encourage the BLM to work with stakeholders to research interim measures, such as those presented by the Four Corners Air Quality Task Force, to determine which emission mitigation strategies should be required as future lease and application for permit to drill (APD) conditions. The state also requests BLM's assistance with the installation of additional air quality monitoring stations in order to gather further, more detailed, baseline data of the current and ongoing concentration levels for the full suite of regulated emissions.

Specifically, as the BLM Vernal Field Office makes future planning level decisions and site-specific decisions to implement the Final Vernal RMP, we request that future air quality analyses include:

- Photochemical modeling to evaluate the formation of ozone and secondary particulate matter, as both of these pollutants are currently trending upwards in the rural parts of Utah. Models used for the analysis of ozone and PM_{2.5} should include the chemistry module needed to estimate the formation of secondary pollutants, *e.g.*, a photochemical grid model such as the EPA's Community Multi-scale Air Quality model (CMAQ).

- Project evaluations should assume, within the reasonably foreseeable development scenarios, that leasing and exploration will result in full-field development. Modeling should be conducted based on these reasonably foreseeable full-field development scenarios.

- Existing emission sources that may have coincident impacts. This means that an understanding of the emissions from other nearby existing or planned sources is needed.

- Anticipated worst-case meteorological conditions for each dispersion scenario, *e.g.*, the meteorological condition for high near-field impacts would be different than the meteorological conditions leading to high long-range transport.

- Attainment of all applicable air quality-related requirements and standards. An evaluation of all criteria pollutants with specific emphasis on PM_{2.5}, ozone, and their precursors should be made.

- Impacts to visual resources and other air quality-related values that have been identified by the federal land managers.

Wild and Scenic River Designation Studies:

In addition to the state's comments on the 2005 DEIS, the state adds the following:

In an effort to understand the nature and extent of the effects of wild and scenic river designations, Utah State University conducted a Wild and Scenic River designation study. The study was designed as: (1) a literature review and analysis of the recreation impacts of Wild and Scenic designation, and (2) a literature review and case study analyzing the impact of designation on non-recreational aspects of the economies of local communities and users. Preliminary results indicate: (1) a lack of any "before and after" studies concerning the effects of designation of a wild and scenic river segment, (2) anecdotal indications of a designation effect as reported by researchers, but no statistical evidence, (3) the single study which statistically examined a designation effect found no evidence of an effect, and (4) various effects on uses of private lands and public land uses within and as a result of the designation. Complete findings will be available soon.

The state is also concerned about suitability findings for those streams where there are significant water diversions upstream of the subject reach, most of which are for irrigation. This is particularly true for the Green and White river drainages. While federal reserved water rights are traditionally not asserted prior to designation, those stream reaches found suitable are

managed as if they were designated. This "manage-as-if-designated" approach has the unfortunate and inaccurate potential to cause managers to believe a *de facto* federal reserved water right exists for those reaches, and thereby to impact the future management and utilization of valid existing water rights above, below and even within, the reaches. The state strongly believes that the suitability determination phase is the proper time to begin negotiations concerning the extent of any future federal reserved water rights, and requests the BLM to do so as the Final Vernal RMP is prepared. As a minimum, the State Engineer requests the BLM catalog all valid, existing water rights which may be affected by designation as part of the Final EIS.

Grazing, Wildlife and Watersheds:

In addition to the comments submitted concerning the 2005 DEIS, the state adds the following:

The state supports, as a matter of policy, well-planned and managed livestock grazing, and considers the same as an important landscape-scale tool for creating and maintaining healthy watersheds and resources, including healthy habitat for wildlife. The state encourages the BLM to adopt the principle that functionality of the watershed underlies all the resource values of the planning area. The state and BLM are, of course, partners in a major effort to improve the health and functionality of watersheds through the multi-agency efforts of the Utah Partnership for Conservation and Development. To date, many thousands of acres of range and watershed lands have been reclaimed and restored through active efforts and properly managed grazing. Other oft-cited examples of the use and value of prescriptive grazing and associated wildlife management are the privately-held Deseret Land and Livestock Ranch, and the Hardware Ranch managed by the state's Division of Wildlife Resources. Flexibility of management practices has been the key to success of these two operations.

Because of the value of grazing, the state, among other purposes, is supportive of the use of livestock in a prescriptive manner, that is tactical use of livestock to accelerate progress toward improved rangeland health and the reduction of catastrophic fire risks. The state strongly suggests that BLM support flexibility within the management provisions for livestock grazing time (duration) and timing (season of use) in the Final Plan. Through the Utah Partners for Conservation and Development, the Watershed Restoration Initiative, and the Utah Grazing Improvement Program, the state stands ready as a partner to work with the BLM to rehabilitate resources and improve grazing practices to benefit watersheds, wildlife and livestock. Retaining flexibility in the season of use will greatly aid in the control of undesirable plant species, and in the control of the fuels responsible for catastrophic fire.

For these reasons, the state is extremely concerned about the tenor and content of statements in the Supplement which assert that grazing and wildlife are not mutually beneficial, and that elimination of grazing will automatically improve rangeland health. For example, within the discussion of Forage on pages 2-5 to 2-7, BLM proposes that, in the event of a loss of forage or a demonstrated conflict between livestock and wildlife, livestock numbers would be reduced. Similarly, the discussion of impacts on pages 4-31 to 4-32 indicates that "forage

production would likely increase ... resulting in increased feed ... and an improvement in rangeland health," through a reduction in grazing AUMs. Further, on page 4-91, the Supplement states that "grazing is a threat to all listed and most sensitive species." The state opposes the implication, contained within these statements, that wildlife are, *a priori*, better for the health of the range than a proper, balanced program of grazing by livestock and use by wildlife. These statements contravene the principles mentioned above. The state supports the concept stated by BLM to the effect that "[p]roper levels of use sustain a healthy vegetation condition that would support continued livestock grazing." See p. 4-31.

The state expects, subject to the discussions of the ranch acquisitions discussed in our 2005 comments, that the BLM will work with the state to seek an equitable reduction in wildlife, horse and livestock numbers in the event of a decrease in forage, and will similarly work with the state to seek an equitable reduction in livestock and wildlife numbers in the event of a demonstrated conflict. Further, as range conditions improve, perhaps through the cooperative efforts mentioned above, the state expects a balanced allocation between livestock and wildlife, until, somewhere within the Vernal FO, all non-use and suspended AUMs are again active.

The state also requests that BLM support its apparent decision to exclude grazing upon areas which produce 25-32 lbs of forage per acre or less with scientific evidence. In addition, the state encourages the BLM to cooperate with the state and conservation organizations to actively monitor and record grazing use data, wildlife populations and range conditions. The Final RMP should contain and rely on a robust monitoring program so that resource managers and users can communicate, learn, assign responsibilities, and use adaptive management to meet land health objectives.

On a related note, the state believes the BLM should only employ the term "critical habitat" when referring to the legal habitat designations for endangered and threatened species under the Endangered Species Act. The state requests that the BLM use the "crucial habitat" designations mapped by the Division of Wildlife Resources solely as descriptive wildlife habitat designations, not as automatic exclusion zones for other multiple uses.

Inventory and Proposed Management of Areas with Wilderness Characteristics:

The State of Utah has reviewed BLM's inventory of and proposed management for lands identified as possessing wilderness characteristics. The state does not believe that BLM has the authority to create a category of management based solely on the characteristics of wilderness. The characteristics of wilderness, or their constituent elements, were first recognized by the Wilderness Act of 1964 and passed to the BLM within the provisions of Section 603 of the Federal Land Policy and Management Act of 1976. The authority within Section 603 has now expired by its own terms. The state recognizes that recent court decisions have affirmed BLM's authority to inventory for wilderness characteristics, and have required the BLM to consider new information about these characteristics in its documents prepared under the National Environmental Policy Act. These decisions do not, however, consider or affect the BLM's statutory authority for management policies on the BLM lands. The state cautions BLM against an overly broad reading of these decisions. Management authority must be derived solely from

the specific provisions of the Federal Land Policy and Management Act, (e.g. Areas of Critical Environmental Concern) or other specific federal legislation, and it is incumbent upon the BLM to carefully define its detailed legal rationale and reasoning for its proposed management policies, provisions and categories.

The State of Utah is committed to outdoor recreation, including primitive and non-motorized recreation, as an activity of great interest to the residents of Utah, and as an economic driver. The state supports retention of appropriate areas in their primitive, semi-primitive or rural state, after due consideration and in compliance with legal requirements. The state looks forward to working with the BLM to find appropriate management prescriptions and structures to protect primitive, semi-primitive and rural areas for the use of its citizens, and those of the nation.

Thus, the state asks BLM to provide a detailed explanation of the rationale and authority for management of lands solely because of wilderness characteristics, and why such management does not circumvent the provisions of the statutorily required wilderness review process. *See* 43 USC § 1701(l) and Utah Code § 63-38d-401(6)(b). As the Vernal Field Office moves forward, the state encourages BLM to take great care to read the court decisions carefully, and to comply with the Settlement Agreement resolving *Utah v. Norton*, No. 2:96CV0870 B (D.Utah, Sept. 9, 2005). In particular, BLM should not exercise its authority under section 202 of FLPMA in a manner that establishes, manages or otherwise treats public lands as wilderness unless those lands were congressionally designated as wilderness or were previously designated as wilderness study areas pursuant to section 603 of FLPMA. In addition to these cautions, the state requests that, in weighing management options for the Final RMP, BLM give strong consideration to recommendations submitted by local government and not manage lands to protect wilderness character where such management would, in the opinion of local governments, be contrary to existing uses and the interests of local residents. BLM should also consider the existence of inholdings and valid existing rights, including school trust lands, and not manage areas for protection of wilderness characteristics where development of inholdings or valid existing rights may compromise management of the area. Additionally, the BLM should consider impacts to activities on other lands which adjoin the BLM lands, especially with respect to the landowner's ability to use or develop that land.

The state understands that Uintah County will submit a two volume set of field evidence gathered concerning the areas BLM asserts contain wilderness characteristics. The state strongly suggests BLM give this new field information serious consideration with respect to the existence of wilderness characteristics. More detailed comments, and comments specific to individual areas identified as possessing wilderness character, are provided in "Attachment A" below.

Utah's Trust Lands and Land Tenure Adjustment:

Utah's School and Institutional Trust Lands Administration (SITLA) is an independent state agency responsible by law for management of lands granted to the State of Utah pursuant to the Utah Enabling Act, Act of July 17, 1894, 28 Stat. 109, for the financial support of Utah's public schools and other state institutions. The United States Supreme Court has referred to this

Enabling Act land grant as a "solemn compact" between the United States and the State of Utah that obligates the United States to take into consideration the purposes of the grant when managing federal lands.

The State of Utah is obligated by both the Utah Enabling Act and the Utah Constitution to act as a trustee in managing school trust lands. Among the fiduciary duties imposed by this trust on SITLA is the duty to manage trust lands in the most prudent and profitable manner possible, and not for any purpose inconsistent with the best interest of the trust beneficiaries. Revenues from school trust lands are deposited in the Permanent School Fund, a permanent endowment for public education. Interest and dividends from the Permanent School Fund are distributed to individual public schools statewide annually to supplement critical academic needs.

SITLA manages an estimated 465,652 acres of state trust lands within the Vernal Planning Area (VPA), representing approximately 12 percent of all lands in the VPA. *Draft Vernal Field Office Resource Management Plan* at Table 1-1 (2005). Most of these state trust lands are comprised of numbered sections 2, 16, 32 and 36 in each township, representing the grant of in-place school sections made by the Utah Enabling Act; however it also includes lands acquired from the federal government in a land exchange. The significance of the checkerboard pattern of land ownership is that, because most trust lands are surrounded by BLM lands, planning decisions made by BLM with respect to rights-of-way, withdrawals from mineral leasing, special designations (e.g. ACECs, management for wilderness characteristics, etc.) and other determinations inherently impact the state trust lands making them an island within the surrounding BLM lands. BLM's decisions on how to manage its lands directly affect the ability of the State of Utah to manage state trust lands for the purposes for which they were granted by Congress, which was to provide revenue for public schools and other beneficiary institutions.

This is an issue of significant impact to Utah's school trust. Lands within the VPA make up approximately 13 percent of Utah's total surface trust land portfolio. At the current time, approximately 77,019 acres of surface and/or mineral trust lands are inheld in WSAs in the VPA. When these lands are added to the 131,963 acres included in proposed special designations, including Non-WSA with wilderness characteristics in Alternative E, most of which is either closed to oil and gas and most other mineral exploration or NSO, Utah's school trust will be left with approximately 208,982 acres of lands within the VPA that cannot produce revenue or will have reduced revenue potential.

Conversely, management by SITLA of state trust lands within special designations can directly affect the ability of BLM to achieve management objectives. SITLA is not obligated by law, for example, to manage its lands within BLM areas managed for wilderness characteristics or ACECs for environmental protection. SITLA development of inholdings consistent with SITLA's governing mandate may substantially defeat the purpose of the special designation. For this reason, it is in the best interests of the United States as well as the State of Utah that the Final RMP create a robust and effective program for land tenure adjustments.

The need for BLM to give priority to state-federal land exchanges has been recognized by BLM in the BLM Manual:

The BLM recognizes that resolving these land ownership and management issues is an important public purpose *and gives priority to the exchange of state trust lands out of areas designated by the federal government for special purposes.*

BLM Manual H-2200-1, Chapter 13, B (emphasis added).

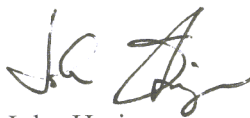
As more specifically set forth below, SITLA believes that the Supplement fails to address adequately these two major issues: the impact of BLM management decisions on state trust lands, and the need for a substantially more robust program for land tenure adjustments between the BLM and the State of Utah. BLM has an obligation to include in its planning an effective and timely means of addressing the impact of federal land actions on in-held state trust lands.

Real Property - Water:

BLM asserts it will honor all valid, existing rights. However, it appears that this statement may only apply to oil and gas, minerals, and grazing; no mention is made of water rights. Under Utah law, approved and perfected water rights are considered real property. BLM actions may, therefore, affect the value of this real property. Because of this, the State Engineer recommends that the BLM consider the impact its actions may have on water rights in general and non-BLM water rights in particular. This recommendation is particularly important because the right to use water is the underpinning of most economic, environmental, and social activities. If it is determined that any valid, existing water right will be negatively affected by BLM actions, then possible mitigation and/or compensation actions should be discussed.

In conclusion, thank you for the opportunity to comment. The state looks forward to continuing to work with the Vernal Field Office as a Cooperating Agency. Further detailed comments and the various studies mentioned are attached. Please feel free to contact me with any questions or concerns about these comments, or the state's continuing desire to work with the BLM on the Final Resource Management Plan for the Vernal Field Office.

Sincerely,

A handwritten signature in black ink, appearing to read 'John Harja', written in a cursive style.

John Harja
Director

cc: Vernal Field Office

Attachment A Further State Concerns and Comments

Wildlife Habitat:

Non-WSA Lands Designation

Under Alternative E, 277,596 acres would be categorized as non-WSA lands with wilderness characteristics. While closing these 25 areas to oil and gas development would reduce potential habitat loss, habitat fragmentation, and wildlife displacement, the ability to restore degraded wildlife habitat would be severely restricted. Because of altered fire regimes, invasive species, and other factors, the habitat conditions on these lands managed by the Vernal Field Office are no longer natural. Consequently, natural processes alone will not be enough to maintain or restore healthy watershed conditions. The lack of vegetation management could result in significant winter range loss for big game, and decreased crucial habitat for sage-grouse. Moreover, vegetation treatments by natural processes may also be detrimental to sage-grouse populations, could reduce big game habitat, and limit the ability of UDWR to conduct habitat restoration. While prescribed fire would be allowed in the 25 areas classified as non-WSA lands with wilderness characteristics, other treatment methods including mechanical and chemical techniques may be more appropriate in these areas, especially where cheatgrass and other invasive species are present. The BLM is a key participant in the Utah Partners for Conservation and Development (UPCD) and the Utah Watershed Restoration Initiative. The inability to implement habitat restoration projects on BLM lands with wilderness characteristics would impede the UPCD's ability to restore and maintain healthy watersheds.

UDWR is especially concerned about the following non-WSA lands with wilderness characteristics: Bitter Creek, Bourdette Draw, Bull Canyon, Cold Springs Mountain, Cripple Cowboy, Daniels Canyon, Dead Horse Pass, Diamond Breaks, Diamond Mountain, Hells Hole Canyon, Hideout Canyon, Lower Bitter Creek, Lower Flaming Gorge, Mexico Point, Moonshine Draw, Mountain Home, Rathole Ridge, Stuntz Draw, Sweetwater Canyon, Wild Mountain, and Wolf Point. Each of these non-WSA lands with wilderness characteristics has expansive areas suitable for watershed restoration using a variety of techniques including prescribed fire, chemical, and mechanical manipulation. UDWR cannot support any designation that would preclude an active watershed restoration program for these areas utilizing modern restoration methods.

Habitat restoration work would also be restricted under Alternative E due to 277,596 acres categorized as non-WSA lands with wilderness characteristics proposed to be managed under VRM class I. The VRM class I areas under Alternative E are vast and include crucial game, non-game, and sensitive species' habitats that require vegetation restoration activities. We recommend these areas not be precluded from vegetation manipulation using a full set of vegetation management tools including prescribed fire, chemical, and mechanical treatments.

Special Status Species

The BLM should reference the newly developed Utah Wildlife Action Plan (UWAP) in the Vernal RMP Final EIS (Section 1.5 page 1-13). The UWAP describes how species of concern will be managed in the State of Utah. These species should be included in the RMP where special status species are discussed. The UWAP also describes priority habitat types in Utah which support most of Utah's Sensitive Species. The BLM was a cooperator during the development of the UWAP and by Executive Order 13352, Facilitation of Cooperative Conservation, should acknowledge this plan as the basis for wildlife management in the state of Utah.

Mitigation

Oil and gas development has increased in the planning area since the original DEIS was released in January 2005. The state urges BLM to consider the current level of development proposed in the VFO and evaluate the impacts and mitigation strategies in the Final RMP EIS.

The state encourages BLM to emphasize the importance of mitigation of disturbances from oil and gas activities and other development in the RMP. Without meaningful and well-planned mitigation, long-term impacts to wildlife and their habitats cannot be avoided from accelerated development activities being experienced in the Vernal Field Office. Development of oil and gas resources in crucial wildlife habitat is rarely insignificant and every effort should be made to minimize and mitigate the impacts. The RMP should set the basis for a strong mitigation program. Furthermore, the RMP should structure a path for off-site mitigation. Due to well spacing patterns and physical conditions of the development area, it may not be possible to complete meaningful mitigation for some wildlife species on-site. Off-site mitigation where soils, vegetation, precipitation, and other physical conditions are appropriate must be considered to facilitate a meaningful offset of impacts to wildlife and their habitats where onsite mitigation is not practical.

Coordination Among Land Managers:

The state understands that, as part of the planning process, the Vernal Field Office met with other agencies with land management jurisdiction within or adjacent to the Vernal planning area. We encourage the Vernal FO to continue meeting with Park Service, Forest Service, state, local and tribal governments, and to use these meetings as an opportunity to harmonize management across jurisdictional boundaries, and to disclose, as part of the Final EIS, specific areas of management conflict and steps the Vernal FO will take to resolve conflicting management objectives.

The state notes that neighboring BLM field offices are currently preparing RMPs and have Reasonably Foreseeable Development Scenarios (RFDS) for their plans. These RFDSs indicate how much development is anticipated to occur over the lifetime of the plans. Other federal agencies within the region may have RFDSs or similar projections for development on their lands. These should be identified and considered within the analysis. We also encourage

the BLM to contact all state, federal, and tribal agencies within the region and collaboratively identify all significant reasonably foreseeable future actions that are likely to impact resources within the Price planning area. Such an analysis is especially important for air quality-related values, wildlife habitat, and social and economic impacts.

Recreation:

There would be a significant impact on motorized use within the planning area if Alternative E were selected. Current trends suggest the majority of recreational use in the future will be motorized and developed recreation. Based on these trends, the recreation planning for this area should be framed to meet a larger share of this demand. We are not opposed to land allocations for non-motorized primitive and semi-primitive uses where they do not impact areas already heavily used and valued by motorized recreationists. A better balance than that suggested by Alternative E seems more appropriate for this area. We agree with statements found in the 4.10.2.6.5.3 *Trails*: "Alternative E would not develop or improve motorized trails as is prescribed in Alternative D. Thus, opportunities for backcountry driving and OHV recreation would be limited to the road and trail system that currently exists. Red Mountain Trail is the only trail currently managed and maintained for motorized use. The lack of additional trails could produce an increase in cross-country travel, thereby increasing the adverse impacts to vegetation, soil, water, wildlife habitat, and scenic quality within the Vernal Planning Area (VPA). Without further OHV opportunities, there could be an increase in overland riding, user conflicts, user densities, and a decline in visitor safety within the VPA.

If all of the non-WSA lands with wilderness characteristics were included in the final decision, motorized use would be concentrated in the remaining lands. This could cause significant management challenges. Dispersing use on managed route systems provides a much more satisfactory recreation experience and provides fewer management problems.

Alternative E would eliminate routes needed to complete loop opportunities that are crucial to successful management of OHV use. This seems to be counterproductive to the overall management of the planning area. Proposed Wild and Scenic River designations for Argyle Creek and Nine Mile Creek could also impact existing OHV loop trails. The road up Argyle Canyon and the road crossing the lower end of Nine Mile Creek are both needed for OHV loop trails and should be left open for motorized use. The following changes to routes depicted on Figure 28e – Travel/OHV Areas-Alternative E, are recommended to preserve existing routes currently being used by OHV enthusiasts.

1. Red Mountain/Sand Pockets: This area is shown as being closed to OHV use, yet the document acknowledges the designated Red Mountain Trail. Also, there are several trails in the Sand Pockets area that are heavily used and may someday soon be connected to Steinaker State Park. We recommend this area be reclassified as "limited" rather than "closed."

2. Bourdette Draw/Cliff Creek/Cliff Ridge: There are several existing routes connecting Bourdette Draw and Cliff Ridge that are currently being used by OHV users as part of a loop

trail system in this area. Also, the existing route down Cliff Creek from Bourdette Draw is an important link in a loop trail. We recommend this area be reclassified as "limited" rather than "closed."

3. *Nine Mile*: There is an existing road that constitutes the north boundary of the southern portion of the Desolation Non-WSA lands with wilderness characteristics area. This road continues east and south across Nine Mile Creek and then proceeds west into Carbon County to Horse Bench. This is a portion of an existing loop trail that is highly prized by OHV users. The Price Field Office's Draft RMP has their portion of this trail open to motorized use. We think the Vernal part of this trail should remain open to preserve continuity between the plans. Also, it is noted on this map that the route up Frank Canyon has been left open for motorized travel as part of this loop trail.

In the past, a wide variety of users have enjoyed significant motorized access. Routes developed for mining, oil and gas exploration, range development, etc., have been explored and adopted by OHVs users and incorporated into popular trail systems. We believe these systems make up a very important segment of the overall OHV opportunity in the state and, for the most part, should be preserved for future use to meet the acknowledged demand. We would request the opportunity to discuss specific route concerns with the BLM before the final decision is made.

Water Resources & Rights:

Potential Reservoirs

The state's Division of Water Resources has conducted a review of proposed reservoir sites located within the BLM Vernal Field Office. After eliminating those sites with a low probability of being built, the Division identified one reservoir site located on BLM land that should be considered for possible future development.

The proposed Spring Creek Reservoir project is located northwest of Vernal, Utah, at Spring Creek in Section 20, T03S, R20E, SLBM. This site is located in of the Red Mountain Dry Fork ACEC. This reservoir would impound 40,550 acre-feet of peak flows of Ashley Creek to control spring runoff and flooding. The project diversion and feeder system would be located largely on BLM lands. Dam and dikes would be located entirely on BLM land and the body of the reservoir would cover BLM and private land. North 2500 West road, which runs directly through the reservoir basin, would most likely be relocated to the east of dike #1 (the east dike) onto BLM land. The Division provided the BLM's contractor for the RMP with a map and short write-up on the proposed project.

This project would provide valuable flood control benefits to farmers and to the city of Vernal, which Ashley Creek runs through. Past flood control projects, which would have been placed on National Forest lands to the north, have been rejected by the Forest Service. This site remains one of the few options left to divert enough water to control Ashley Creek above Vernal.

It is therefore requested that the BLM make provisions in its Vernal Area RMP to allow the future development of Spring Creek Reservoir.

The Division is also interested in maintaining the easements and rights-of-way granted by the BLM for construction of the White River Dam, located in Section 17, T10S, R24E, SLBM. Correspondence from the Division to the BLM over the past several years has expressed this interest. The BLM has been agreeable to allowing the Division to continue holding these easements.

History - Cultural Resources:

The following comments should not be considered Utah State Historical Preservation Officer (SHPO) comment under Section 106 of the National Historic Preservation Act. The state anticipates further consultation with the SHPO regarding more specific effects to cultural resources under the National Historic Preservation Act when the Final Plan is developed.

The state appreciates the BLM's efforts to conduct proactive resource identification, to work with rural communities towards understanding historic values, and to prioritize cultural resource inventory areas within the plan and under Section 110 of the National Historic Preservation Act. The state suggests that BLM develop a specific ongoing program to identify and target identification efforts under Section 110 of the National Historic Preservation Act. Such a program could include taking input from the public on potential priority areas and balancing identification needs with public, tribal, development and resource interests, in consultation with the State Historic Preservation Officer. The state recommends that priorities include potential heritage tourism development in addition to more typical resource investigation and/or protection efforts. Under such a flexible strategy, identification efforts could better respond to public needs and interests. BLM should commit to developing a specific, measurable procedure for funding, identifying and conducting such resource identification efforts due to the overall benefits of these efforts for future plans and actions.

Non-WSA Lands with Wilderness Characteristics:

The State of Utah reviewed all the Wilderness Characteristics Review forms posted on the Vernal Field Office's web page. These forms document BLM's evaluation of each area proposed or otherwise identified as potentially possessing wilderness characteristics. In determining which non-WSA lands possess wilderness character, BLM consistently looked to the existence of opportunities for solitude, and primitive and unconfined recreation. *See e.g.* Moonshine Draw, Mountain Home, Rat Hole Ridge, and Sweet Water Canyon. The Wilderness Act's definition of wilderness includes "*outstanding* opportunities for solitude or a primitive and unconfined type of recreation." *See* 16 U.S.C. § 1131(c) (emphasis added). BLM direction regarding wilderness characteristics similarly demands *outstanding* opportunities for solitude or a primitive and undefined type of recreation. *See* BLM Land Use Planning Handbook H—1601-1 at Appendix C, p. 12, and Instruction Memorandum 2003-275 – Change 1 at Attachment 1. It appears that the standard applied by the Vernal Field Office is less rigorous than that required by

the Wilderness Act and agency direction. If the Vernal Field Office applied a less rigorous standard, it may have misidentified areas as possessing wilderness characteristics.

Each determination of wilderness characteristics notes that the VFO "determined appropriate setback distances for pipelines, roads, and other R-O-Ws." Other Field Offices did not adopt this approach. Please explain the difference in approaches. With respect to setbacks, some but not all non-WSA areas identified as possessing wilderness characteristics were reduced in size because of buffers. *Compare* Diamond Mountain and Daniels Canyon. Please clarify if all proposed areas were treated similarly, and if not, why different treatment was appropriate.

Many of the analysis areas are heavily leased (*e.g.* Bull Canyon 90 percent, Cripple Cowboy 85 percent, Hell's Hole 83 percent). We recognize that the existence of an undeveloped lease does not defeat potential wilderness characteristics. However, the existence of valid existing rights may effectively prevent the BLM from managing these areas for protection of wilderness characteristics. Accordingly, the state strongly discourages management prescriptions that create management conflicts. If areas with valid existing rights are managed for protection of wilderness character, how would the Vernal Field Office manage future development of valid existing rights to avoid compromising outstanding opportunities for solitude or a primitive and unconfined type of recreation?

Several of the analysis areas border Dinosaur National Monument, which is managed for wilderness values. The monument boundary is fenced. Where these analysis areas depend on the monument for satisfaction of the 5,000 acre criteria, the existence of a fence appears to detract from wilderness values. Please explain what kind of fence separates the Monument from adjacent BLM lands and why the existence of this fence does not compromise values dependant on adjacency.

Comments specific to individual areas identified as non-WSA lands with wilderness characteristics.

Comments regarding non-WSA lands analyzed for the existence of wilderness characteristics are based on the state's review of background documents provided by the Vernal Field Office. These documents are generally entitled "Wilderness Characteristics Review" (hereinafter "review forms") and are specific to nominated areas.

Bourdette Draw

The review form notes that portions of area 2 that were determined not to have wilderness characteristics are discussed under heading 4.b.(5). No such discussion exists. Please clarify which areas were excluded, why, and how the features or activities that contradict wilderness character would impact "outstanding opportunities for solitude or a primitive and unconfined type of recreation" on adjacent lands.

Diamond Breaks

The review form does not identify any areas as having wilderness characteristics, but the attached map and Box 3.b. do. Please either substantiate any inference from the map that wilderness characteristics exist, or revise the map to indicate that no wilderness characteristics exist.

Lower Bitter Creek

The review form indicates that a juniper removal project is scheduled for 2007. Please clarify how this will be undertaken to avoid interfering with the appearance of naturalness within the treatment area.

Mountain Home

The map shows numerous routes in sections 27-28 and 33-35 of T3N, R24E. Please discuss these routes and the extent to which they compromise the appearance of naturalness or "outstanding opportunities for solitude or a primitive and unconfined type of recreation."

White River

It is difficult to distinguish external nominations from BLM internal nominations. The inability to distinguish areas complicated any attempt to evaluate VFO's analysis. Please be more specific regarding nomination areas and the location of features within these areas.

Cherry stemming roads that are "regularly used by trucks hauling water from the White River for oil and gas exploration and development" would not appear sufficient to protect "outstanding opportunities for solitude or a primitive and unconfined type of recreation." Please clarify how regular truck use can occur without compromising these values.

Based on the review form, it appears that there are 58 pending APDs within this area. This level of development does not appear compatible with "outstanding opportunities for solitude or a primitive and unconfined type of recreation." Please clarify how VFO would protect "outstanding opportunities for solitude or a primitive and unconfined type of recreation" in light of this level of development, including the ancillary facilities such as roads, pipelines and compressor stations that appear reasonably foreseeable.

Wolf Point

It appears that an existing airstrip and several wells are within area 1, but have been cherry stemmed out. Please clarify how continued use of these facilities would be managed to protect "outstanding opportunities for solitude or a primitive and unconfined type of recreation."

ATTACHMENT B

ATTACHMENT B

Utah Public Lands Study – Key Social Survey Findings for Daggett, Duchesne and Uintah Counties

A statewide social survey was conducted by Utah State University in 2007 to assess the ways in which Utah residents use and value public land resources, and their views about public land management. Random samples of residential households were selected in each of the state's 29 counties. Sampled households were contacted by mail, and a randomly-selected adult from the household was asked to participate in the survey. Self-completion questionnaires were distributed to potential survey participants using a multiple-wave survey administration procedure. The discussion that follows is focused on key survey results obtained for Daggett County (n = 41 survey responses), Duchesne County (n = 108 survey responses), and Uintah County (n = 119 survey responses).¹

Economic Linkages to Public Lands

One major focus of the survey questionnaire involved assessment of the various ways in which Utahans may engage in economic activities that are linked directly or indirectly to public land resources in the state.

Permit-Based Economic Activities

As indicated in Table 1, only a minority of survey respondents in Daggett, Duchesne, or Uintah Counties reported that a portion of their household income is directly linked to activities that involve permitted uses of lands or resources administered by the U.S. Forest Service, the Bureau of Land Management (BLM), other federal agencies, or the State of Utah. In Daggett County reports of income derived from permit-based economic activities on public lands most often involved activities involving land administered by the Bureau of Land Management (12.2%). In Duchesne County these types of economic linkage to public lands were reported most often for activities involving land administered by the State of Utah (13.9%), followed by the Bureau of Land Management (11.1%). In Uintah County such linkages were most frequently reported for permit-based activities involving Bureau of Land Management lands (21.8%) and lands administered by the State of Utah (14.3%). Overall, these types of connections to public lands in Utah appear to be most prevalent among residents of Uintah County, and least prevalent among those living in Daggett County.

¹ The number of respondents for Daggett County is small in part because the commercial firm that provided random samples of residential mailing addresses for the statewide survey was able to identify only 183 potentially valid residential addresses in that county. In addition, 110 of the questionnaire packets that were mailed to addresses included in the sample were returned as undeliverable. As a result of this unexpectedly small sample size, results for Daggett County should be interpreted cautiously.

Table 1. Percentage of survey respondents reporting that a portion of household income is directly linked to permitted use of public lands or resources.

<u>Agency</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Forest Service	12.2%	5.6%	8.4%
BLM	4.9%	11.1%	21.8%
Other federal agency	0.0%	6.5%	7.6%
State of Utah	2.6%	13.9%	14.3%

The data reported in Table 2 reflect the percentage of respondents reporting these types of permit-based economic linkages to public lands who also indicated that 25% or more of their total household income is derived from those activities. Since in many cases the number of respondents reporting such economic linkages was small, these values are based on a limited number of cases and as a consequence need to be interpreted with caution. Nevertheless, it is clear that in all three of these counties the survey respondents who reported participation in permit-based economic activities on public lands often rely fairly heavily on those activities as sources of household income.

Table 2. Percentage of survey respondents reporting permit-based economic activities on public lands who indicated that 25% or more of their household income is derived from those activities.

<u>Agency</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Forest Service	60.0%	66.7%	40.0%
BLM	50.0%	75.0%	88.5%
Other federal agency	0.0%	67.1%	67.7%
State of Utah	100.0%	20.0%	52.9%

Household Participation in Selected Commercial Activities

The next series of questions asked respondents to indicate whether they or members of their households participate in any of a number of commercial activities that, while commonly associated with public land use, can involve the use of either public or private lands. Results summarized in Table 3 indicate that for any of these activities only a minority of survey respondents in Daggett, Duchesne or Uintah counties reported participation. Among Daggett County respondents the activities reported most frequently were participation in commercial firewood cutting (10% of responses), in oil and gas exploration or development (10%), and in miscellaneous other commercial activities (10.8%). In Duchesne County the activities identified most often included participation in oil and gas exploration or development (26.9%) and livestock grazing or related work (12.3%). In Uintah County the most commonly-reported commercial activities were participation in oil and gas exploration or development (31.4%), livestock grazing and related work (12.7%), and commercial firewood cutting (11.9%). On balance, the response patterns indicate that there is a higher level of engagement in most of these types of resource-based commercial activities among residents of Uintah County than is the case in either Daggett County or Duchesne County.

Table 3. Percentage of survey respondents reporting that they or members of their households participate in selected resource-based commercial activities, on either public or private lands.

<u>Economic Activity</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Livestock grazing and related work	2.5%	12.3%	12.7%
Commercial firewood cutting	10.0%	5.6%	11.9%
Logging, post & pole cutting, or other timber-related work	2.5%	3.7%	6.8%
Mining of coal, uranium or other solid minerals	0.0%	1.9%	5.2%
Mining of sand, gravel, or other construction materials	0.0%	4.7%	5.1%
Oil & gas exploration/development	10.0%	26.9%	31.4%
Operating an outfitting or guiding business	5.0%	1.9%	3.4%
Film making/commercial photography	0.0%	0.0%	0.8%
Other commercial activities	10.8%	3.1%	2.8%

Household Involvement in Businesses Linked to Recreation/Tourism

Survey respondents were also asked whether they or any member of their household operates or works at a business linked to recreation or tourism activity that is influenced by the presence of public lands and resources. The percentage of respondents indicating involvement in such businesses was highest in Daggett County (22.5%). In contrast, relatively few survey respondents from either Duchesne County (8.3%) or from Uintah County (8.0%) said “yes” to this question. When asked to assess how important activities and uses linked to public lands are to the success of this business, over three-fourths (77.8%) of Daggett County respondents, over one-fifth (22.2%) of Duchesne County respondents, and over two-fifths (44.4%) of Uintah County respondents who did report involvement in such businesses said that the influence of public lands is “extremely important.”

Household Involvement in Businesses Linked to Commodity Production

A similar question asked about the involvement of survey participants and members of their households in business that provide services and supplies to farming or ranching operations, logging firms, or other commercial enterprises that use or process natural resources located on public lands. Not a single respondent from Daggett County reported this type of economic linkage involving their household. One out of ten (10.2%) respondents from Duchesne County and two out of ten (21.2%) respondents from Uintah County reported that they or a household member was involved in some way with this type of business.

Ownership of Property or Assets With Values Influenced by Nearby Public Lands

When asked whether they own land, buildings, or other assets that they believe have a monetary value that is significantly influenced by the presence and condition of nearby public lands, 67.5% of Daggett County respondents, 29.6% of Duchesne County respondents, and 18.4% of Uintah County respondents said “yes.” Those who did perceive the existence of such a relationship were then asked to identify specific types of assets that they own and that they believe have a value influenced by the close proximity of public lands. Respondents in all three of these counties most frequently cited their permanent residential property (63.4% in Daggett County, 20.4% in Duchesne County, and 9.2% in Uintah County).

Perceived Importance of Public Lands for Overall Quality of Life

Survey participants were also asked to report how important they think fifteen different types of public land resources and resource uses are for the overall quality of life experienced by people living in their communities. Table 4 summarizes response patterns to this series of questions for Daggett, Duchesne and Uintah counties, with a focus on the percentage of respondents from each county who indicated that they consider a particular type of resource use to be “very important” for local quality of life.

Table 4. Percentage of survey respondents indicating that selected public land resource uses are “very important” to the overall quality of life in their community.

<u>Resource Use</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Grazing of livestock on public lands	68.4%	77.0%	67.3%
Water resources used to irrigate crops and pastures	84.2%	95.1%	94.5%
Water resources used to supply homes and businesses	90.0%	80.8%	90.3%
Water resources that provide important fish/wildlife habitat	87.5%	79.6%	75.9%
Energy resources such as oil, gas, coal or uranium	55.3%	81.2%	83.0%
Sand, gravel or other minerals used in building and construction industries	32.4%	37.4%	46.8%
Forested areas that provide timber used by logging operations and lumber mills	57.9%	45.9%	47.7%
Areas where trees or other vegetation provide important wildlife habitat	82.1%	69.2%	72.1%
Areas that attract tourism and recreational activity	82.1%	55.4%	57.1%
Opportunities to enjoy off-road vehicles, snowmobiling, or other motorized recreation	61.5%	39.2%	60.9%
Opportunities to enjoy hiking, backpacking, cross-country skiing, horseback riding, or other types of non-motorized recreation	66.7%	56.7%	55.5%
Opportunities to hunt for wild game	80.0%	65.0%	66.7%
Opportunities to fish in area lakes, streams and rivers	95.0%	74.0%	70.5%
Undeveloped landscapes where motorized access and resource development are restricted	47.2%	46.5%	40.8%
Areas managed to maintain biodiversity and protect habitat for sensitive or important plants or wildlife	44.7%	35.6%	42.2%

In Daggett County only three of the fifteen types of public land resource use presented in this question were considered “very important” by fewer than one-half of respondents (sand/gravel or other construction-related mineral development, undeveloped landscapes where motorized access and development are restricted, and areas managed to maintain biodiversity and protect plant or wildlife habitat). At the same time, over three-fourths of Daggett County respondents considered water resources used to irrigate crops and pastures, water resources used to supply homes and businesses, water resources used to supply fish and wildlife habitat, areas where trees or other vegetation provide important wildlife habitat, areas that attract tourism and recreation opportunity, opportunities to hunt for wild game, and opportunities to fish in area lakes, streams and rivers to be “very important” to the local quality of life.

In Duchesne County five of these resource uses were considered “very important” by fewer than one-half of respondents (sand/gravel or other construction-related mineral development, timber production, opportunities to enjoy off-road vehicles, snowmobiling, or other motorized recreation, undeveloped landscapes where motorized access and resource development are restricted, and areas managed to maintain biodiversity and to protect habitat). Conversely, five resource uses – grazing of livestock on public lands, water resources used to irrigate crops and pastures, water resources used to supply homes and businesses, water resources used to provide important fish and wildlife habitat, and energy resources such as oil, gas, coal or uranium -- were considered “very important” to the local quality of life by more than three-fourths of Duchesne County respondents.

Four of the resource uses included in this list were considered to be “very important” to the overall quality of life by fewer than one-half of respondents living in Uintah County (sand/gravel or other construction-related mineral development, timber production, undeveloped landscapes where motorized access and resource development are restricted, and areas managed to maintain biodiversity and to protect habitat). Four of the resource uses included in the list -- water resources used to irrigate crops and pastures, water resources used to supply homes and businesses, water resources used to provide important fish and wildlife habitat, and energy resources such as oil, gas, coal or uranium -- were considered to be very important by more than three-fourths of Uintah County respondents.

Recreational Uses of Public Lands

Survey participants were also asked to report whether they had participated in any of a broad range of outdoor recreation activities and other non-commodity use activities on Utah public lands during the prior twelve months. Results from this series of questions are reported in Table 5 and Table 6. These findings clearly indicate that there is widespread participation in many of these public land activities among residents of Daggett, Duchesne, and Uintah Counties.

Table 5 reports the extent of reported participation in thirty different outdoor recreation activities. Among survey participants living in Daggett County, more than one-half reported participation in ten of these activities -- camping, picnicking, day hiking, bird watching, wildlife viewing, nature photography, motor boating, fishing, visiting historical sites, and driving for pleasure/sightseeing on public lands -- during the preceding twelve months. In Duchesne County over half of respondents reported that they had participated in six of these activities – camping, picnicking, wildlife viewing, fishing, visiting historical sights, and sightseeing/driving for

Table 5. Percentage of survey respondents reporting participation in selected recreation activities on Utah public lands during the past twelve months.

<u>Activity</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Camping	68.3%	64.5%	75.4%
Picnicking	82.5%	75.0%	79.7%
Backpacking	23.1%	19.6%	17.3%
Day hiking	72.5%	41.0%	54.9%
Bird watching	53.8%	26.5%	29.0%
Wildlife viewing	82.5%	61.3%	72.6%
Nature photography	61.5%	33.7%	40.2%
Canoeing/kayaking	15.4%	5.9%	10.2%
River rafting	47.5%	9.8%	26.1%
Motor boating	56.1%	20.4%	40.2%
Jet skiing	7.7%	3.9%	8.3%
Swimming	45.0%	24.3%	47.8%
Rock climbing	12.8%	9.5%	15.6%
Mountain climbing	17.5%	15.2%	17.4%
Hang gliding	0.0%	1.9%	0.0%
Mountain bike riding	27.5%	9.6%	13.8%
Hunting	43.9%	39.4%	52.6%
Fishing	82.9%	60.6%	67.8%
Horseback riding	20.5%	26.2%	24.8%
Orienteering/geo-caching	7.7%	6.9%	7.5%
Rock hounding	27.5%	25.2%	27.8%
Visiting historical sites	70.7%	55.1%	64.9%
Resort skiing/snowboarding	12.8%	11.5%	6.5%
Backcountry skiing/snowboarding	7.7%	5.9%	1.9%
Snowshoeing	7.7%	5.8%	4.7%
Snowmobiling	17.9%	9.7%	13.8%
ATV riding	39.0%	31.7%	50.0%
Dirt bike riding	7.7%	3.9%	15.7%
4-wheel driving/jeeping	40.0%	20.2%	39.3%
Sightseeing/pleasure driving	85.4%	79.6%	81.9%

Table 6. Percentage of survey respondents reporting participation in selected non-commodity use activities on Utah public lands during the past twelve months.

<u>Activity</u>	<u>Daggett County</u>	<u>Duchesne County</u>	<u>Uintah County</u>
Collecting firewood for home use	67.5%	26.2%	23.9%
Cutting Christmas trees	37.5%	21.4%	36.0%
Collecting material for craft projects	35.0%	16.7%	21.8%
Collecting rocks for home landscaping	50.0%	26.7%	33.3%
Collecting plants for home landscaping	12.5%	6.9%	9.2%
Gathering wild mushrooms	5.1%	1.0%	0.9%
Gathering pinyon nuts	10.3%	14.7%	13.6%
Gathering berries, herbs or wild foods	5.1%	8.9%	12.8%
Collecting fossils, rocks or minerals	25.6%	20.4%	22.0%

pleasure. One-half or more of Uintah County respondents reported participation during the prior 12 months in nine of the activities -- camping, picnicking, day hiking, wildlife viewing, hunting, fishing, visiting historical sites, ATV riding, and driving for pleasure/sightseeing on public lands.

Responses to a question focusing on participation in a variety of non-commodity use activities on public lands are summarized in Table 6. Among this list of activities, Daggett County respondents were most likely to report that they participate in collection firewood for home use, collecting rocks for home landscaping, cutting Christmas trees, collecting materials for craft projects, and collecting fossils, rocks or minerals. In Duchesne County the activities identified most often included collecting rocks for home landscaping, collecting firewood for home use, cutting Christmas trees, and collecting fossils, rocks or minerals. In Uintah County respondents most frequently indicated participation in cutting Christmas trees, collecting rocks for home landscaping, collecting firewood for home use, collecting material for craft projects, and collecting fossils, rocks or other minerals from public land areas.

Respondents were also asked to identify the one or two activities from the lists presented in these questions that they participate in most often, and to provide detail on where they engage in those activities. Among Daggett County respondents the first of these activities listed by respondents most often involved fishing (35.0% of responses), followed by camping (10.0%). In Duchesne County the first listed activity most often involved camping (29.5% of responses), followed by fishing (13.7%). In Uintah County the activities listed most frequently were camping (29.2% of responses), fishing (12.3%) and sightseeing/pleasure driving (11.3%). When asked to indicate where they participate in the first-listed of their “most frequently pursued” activities, 95% of Daggett County respondents, 74.5% of Duchesne County respondents, and 86.3% of Uintah County respondents who answered the question identified a location within the county where they live.

Attitudes and Preferences Regarding Public Land Management

Two similar sets of survey questions focused on respondents’ attitudes and preferences regarding the extent to which various natural resource use activities or management practices should be reduced or increased by those responsible for managing public lands in Utah. Response patterns to these questions are summarized in Table 7 and Table 8.

The data presented in Table 7 indicate that Daggett County respondents were considerably more likely to prefer an increase rather than a decrease in timber harvest levels, protection of important fish and wildlife habitat, thinning of forested areas to reduce wildfire risk, and development of water storage and delivery systems on Utah public lands. On the other hand, attitudes were more evenly split between preferences for reducing and preferences for increasing mineral exploration/extraction, designation of wilderness areas, exploration for and development of oil and gas resources, livestock grazing, and designation of wild and scenic rivers. Daggett County respondents were also considerably more likely to prefer a reduction rather than an increase in management efforts to protect endangered species.

Among Duchesne County residents respondents were more considerably likely to prefer an increase rather than a decrease in mineral exploration/extraction, timber harvest, oil and gas development, protection of fish and wildlife habitat, use of controlled burns to improve

ecological conditions, thinning of forested areas to reduce wildfire risk, livestock grazing, and development of water storage and delivery systems. To a lesser extent they also were more likely to see an increase rather than a decrease in protection of endangered species and designation of wild and scenic rivers, yet at the same time they were more likely to prefer a reduction as opposed to an increase in designation of wilderness areas.

Uintah County respondents were considerably more likely to express a preference for an increase rather than a decrease in public land management that would involve mineral exploration/extraction, timber harvest, exploration for/development of oil and gas resources, protection of fish and wildlife habitat, use of controlled burns to improve ecological conditions, thinning of forested areas to reduced wildfire risk, livestock grazing, and development of water storage and delivery systems. They were somewhat more likely to prefer a reduction as opposed to an increase in designation of wilderness areas, protection of endangered species, and designation of wild and scenic rivers.

Results summarized in Table 8 indicate that Daggett County respondents were more likely to prefer an increase rather than a reduction in provision of road access to recreation areas, provision of hunting opportunities, development of trails for non-motorized recreation, regulations that restrict motorized vehicles to designated trails, regulations to limit noise and emissions from snowmobiles and ATVs, and development of visitor facilities that would encourage an increase in tourism levels. In Duchesne County respondents were considerably more likely to prefer an increase rather than a decrease in provision of road access to recreation areas, provision of hunting opportunities, development of trails for non-motorized recreation, regulations that require motorized vehicles to stay on designated trails, regulations that limit levels of noise and emissions from snowmobiles and ATVs, and development of visitor facilities that would encourage increased tourism. In Uintah County, responses indicated a stronger preference for increases rather than decreases in provision of road access to recreation areas, provision of hunting opportunities, development of trails for off-highway motorized recreation, development of trails for non-motorized recreation, implementation of regulations that would require motorized vehicles to remain on designated trails, implementation of noise and emission regulations for snowmobiles and ATVs, and development of facilities to attract increased tourism.

Table 7. Survey respondents' attitudes regarding the extent to which various activities occurring on Utah public land should be reduced or increased.*

<u>Type of use/activity</u>	Daggett County		Emery County		Uintah County	
	<u>Reduce</u>	<u>Increase</u>	<u>Reduce</u>	<u>Increase</u>	<u>Reduce</u>	<u>Increase</u>
Mineral exploration/extraction	25.6%	25.6%	7.3%	40.6%	14.7%	43.1%
Timber harvest	12.5%	32.5%	13.5%	29.2%	16.7%	40.7%
Designation of wilderness areas	27.5%	32.5%	31.3%	21.9%	34.6%	21.5%
Exploration for/development of oil and gas resources	22.5%	30.0%	12.4%	45.4%	13.4%	55.3%
Protection of important fish and wildlife habitat	10.2%	53.9%	9.2%	52.0%	7.2%	46.8%
Protection of endangered species	40.0%	27.5%	23.5%	30.6%	34.8%	25.0%
Use of controlled burns to improve ecological conditions	35.0%	30.0%	15.8%	29.5%	7.4%	46.3%
Thinning of forested areas to reduce wildfire risk	10.0%	65.0%	10.1%	53.5%	4.6%	60.2%
Livestock grazing	25.6%	20.5%	9.1%	30.3%	9.3%	32.7%
Designation of wild and scenic rivers	30.8%	30.8%	19.1%	29.7%	25.0%	18.5%
Developing water storage and delivery systems to meet needs of nearby communities	5.0%	52.5%	3.0%	77.8%	2.8%	73.1%

* Original response categories were “major reduction” and “moderate reduction” (combined to create “reduce”) and “major increase” and “minor increase” (combined to create “increase”). “Stay about the same” responses not reported here.

Table 8. Survey respondents' attitudes regarding the extent to which the emphasis placed on various activities occurring on Utah public land should be reduced or increased by public land managers.*

<u>Type of use/activity</u>	Daggett County		Duchesne County		Uintah County	
	<u>Reduce</u>	<u>Increase</u>	<u>Reduce</u>	<u>Increase</u>	<u>Reduce</u>	<u>Increase</u>
Permitting of commercial guiding or outfitter services	28.2%	10.3%	16.2%	18.2%	20.8%	10.3%
Providing road access to recreation areas	15.0%	35.0%	12.7%	40.2%	7.3%	41.8%
Providing hunting opportunities	12.8%	33.3%	10.6%	27.8%	7.5%	47.7%
Developing trails for off-highway motorized recreation	32.5%	30.0%	30.1%	32.0%	17.4%	44.0%
Developing trails for hiking, biking, and other non-motorized recreation	10.0%	47.5%	10.6%	43.3%	8.3%	46.8%
Regulations that require motorized vehicles to stay on designated trails	5.0%	55.0%	9.7%	49.5%	13.5%	45.9%
Regulations that limit levels of noise and emissions from snowmobiles and ATVs	15.4%	46.1%	16.2%	45.4%	21.1%	42.2%
Developing visitor facilities to increase tourism	20.0%	37.5%	14.9%	38.6%	12.8%	42.2%

* Original response categories were "major reduction" and "moderate reduction" (combined to create "reduce") and "major increase" and "minor increase" (combined to create "increase"). "Stay about the same" responses not reported here.

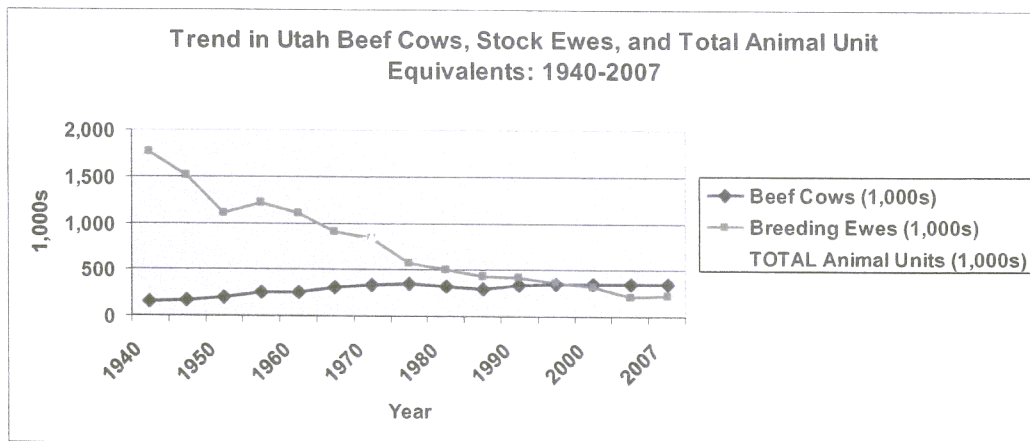
ATTACHMENT C

Attachment C:

Livestock Industry Issues

Beef cattle and stock sheep in Utah, 1940-2007

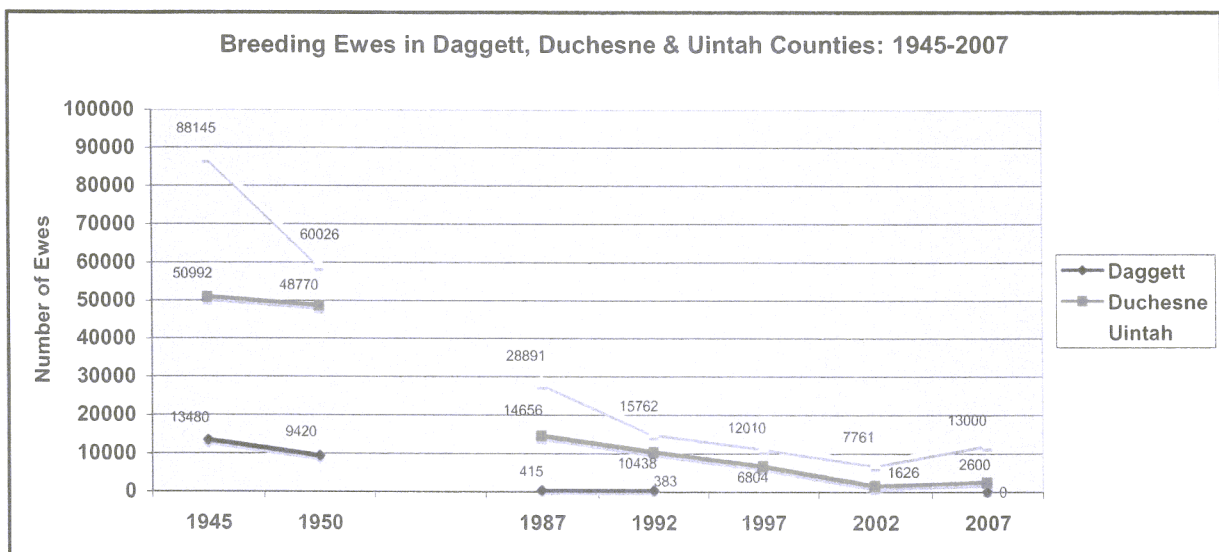
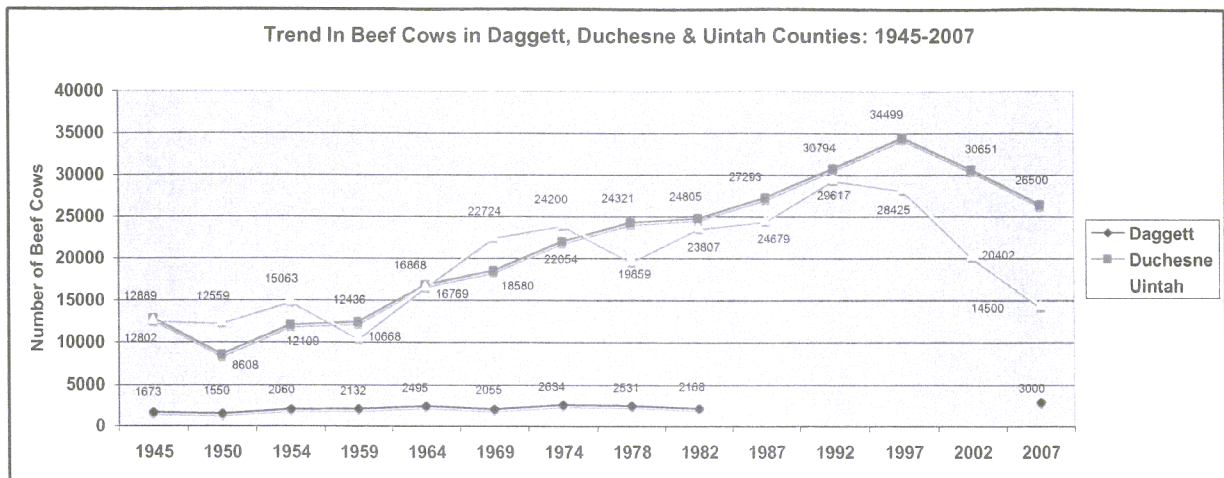
1. The number of beef cows (breeding herd) has more than doubled in Utah over the past 67 years while the number of ewes (breeding herd) has declined to only about 12% of what it was in 1940.
2. The decline in the sheep industry reflects the decline in demand for wool, consumer preference for lamb, more restrictive predator control policies, and difficulties in obtaining labor.
3. Sheep and lamb losses to predators have declined in Utah over the past 20 years. This may be a result in use of guard dogs and other kinds of improved management.
4. Many federal grazing permits have been transferred from sheep to cattle permits and total animal unit equivalents have varied some over the past 67 years.
5. Animal units equivalents (AU's) have declined by about 20% since the 1940's based on cow and ewe numbers. This decline may be more related to an increase in animal size over the period than to an actual decrease in capacity.
6. The decline in the sheep industry and fire control policies coincide with the gradual increase in woody plant domination on Utah rangelands.



Year	Beef Cows (1,000s)	Breeding Ewes (1,000s)	TOTAL Animal Units (1,000s)
1940	155	1,762	662
1945	172	1,516	647
1950	194	1,099	608
1955	256	1,223	757
1960	252	1,099	724
1965	301	903	783
1970	342	846	853
1975	349	575	813
1980	325	506	751
1985	289	432	664
1990	333	420	750
1995	345	357	761
2000	355	321	774
2005	347	208	736
2007	344	220	732

Number of Beef Cows and Ewes in Daggett, Duchesne and Uintah Counties, 1945-2007

1. Beef cow numbers have increased modestly in some Utah counties, perhaps due to improved production techniques. However, numbers have declined in some urban counties such as Davis and Washington counties.
2. All three counties have experienced an increase in beef cows over the period while resident sheep numbers have declined dramatically. Uintah County ewe numbers declined from near 90,000 in 1945 to 13,000 in 2007.
3. Duchesne and Uintah County beef cow numbers increased steadily until the mid 1990's when they began to decline somewhat. Daggett County is small and cow numbers have are not large although they have almost doubled since 1945.



Reported Losses of Sheep and Lambs to Predators 1987-2007

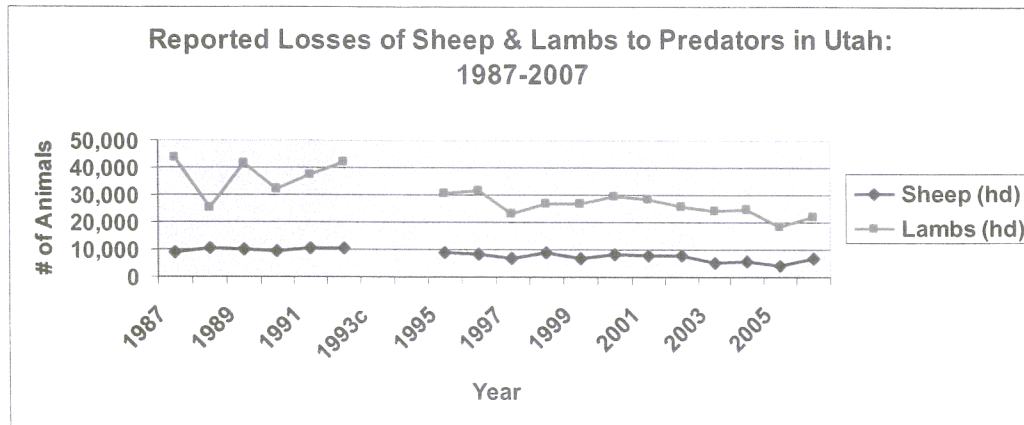
Year	Sheep (hd)	Lambs (hd)
1987	9,200	43,800
1988	10,500	25,200
1989	10,200	41,600
1990	9,300	32,200
1991	10,300	37,600
1992	10,500	42,200
1993 ^c		
1994 ^c		
1995	9,100	30,700
1996	8,400	31,400
1997	6,700	23,300
1998	8,700	27,100
1999	6,600	26,700
2000	8,200	29,300
2001	7,900	28,300

2002	8,100	25,700
2003	5,400	24,100
2004	5,700	24,600
2005	4,300	18,500
2006	6,700	22,300

^aUtah Agricultural Statistics (1988-2007)

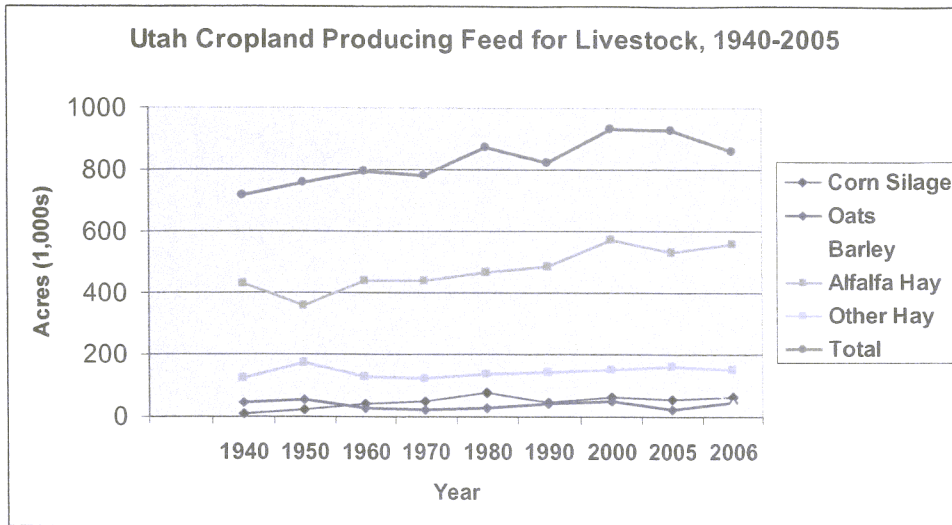
^bLosses not reported for Bobcat and Fox until 1995

^cLosses not reported in 1993 and 1994



Utah Cropland Producing Feed for Livestock, 1940-2005

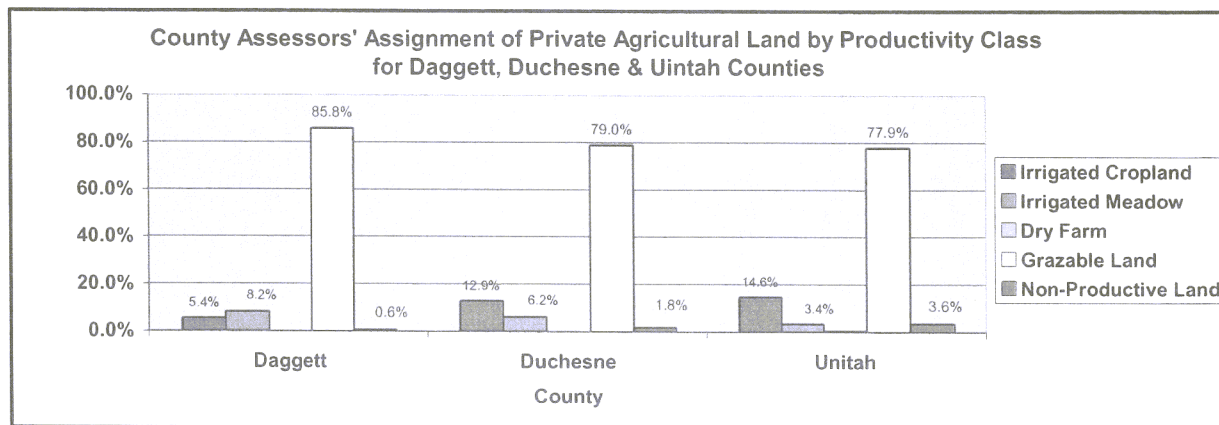
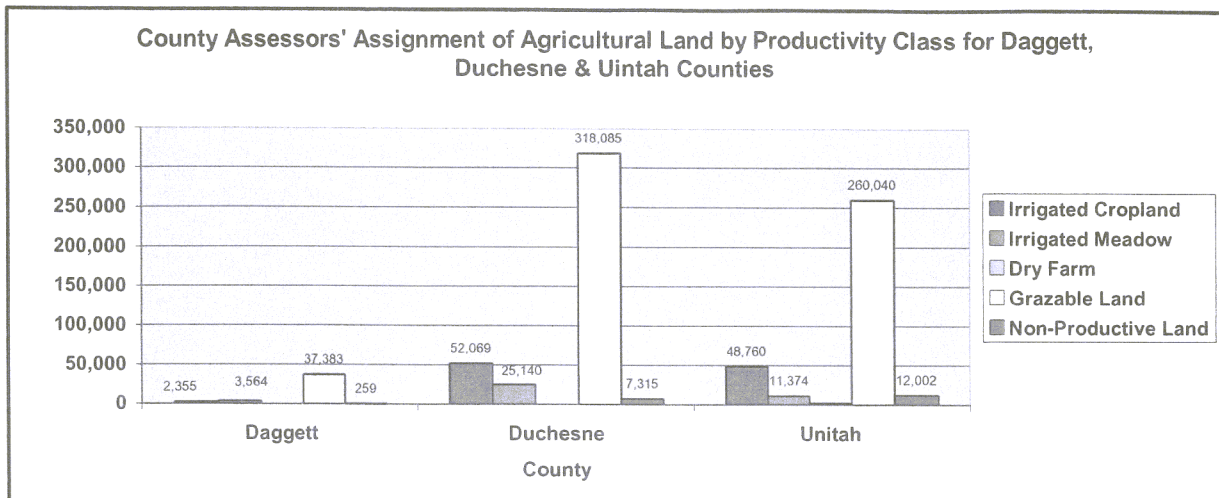
1. Acreage devoted to production of grains and forages for livestock has increased from 718,000 acres to 860,000 acres in Utah since 1940. Changes in irrigation technology could have contributed to this 20% increase in acreage. Total harvested cropland reported in the 2002 Census of Agriculture was 961,037 ac.
2. Corn silage acreage has increased, oat acreage has remained the same, barley acreage has declined, and alfalfa and other hay acreage have increased.
3. These changes may also reflect changes in irrigation technology.
4. The County Assessors have identified about 5,900 acres of arable private land in Daggett County (about 14% of the private land), near 77,000 acres (19% of the private land) in Duchesne County and around 62,000 acres of arable private land in Uintah County (18% of the private land). The County Assessors consider most of the private land (78%-85%) in Daggett, Duchesne and Uintah Counties to be grazable land (low productive capacity).



Utah Crop land used to produce livestock feed, 1940-2005^a

Year	Corn Silage	Oats	Barley	Alfalfa Hay	Other Hay	Total
1940	10	46	109	431	122	718
1950	21	56	146	361	173	757
1960	41	29	160	439	127	796
1970	49	24	148	441	122	784
1980	79	26	162	470	135	872
1990	45	40	115	485	140	825
2000	64	50	95	575	150	934
2005	55	22	160	530	160	927
2006	65	45	40	560	150	860

^aSource: Utah State Department of Agriculture (1984-2007)



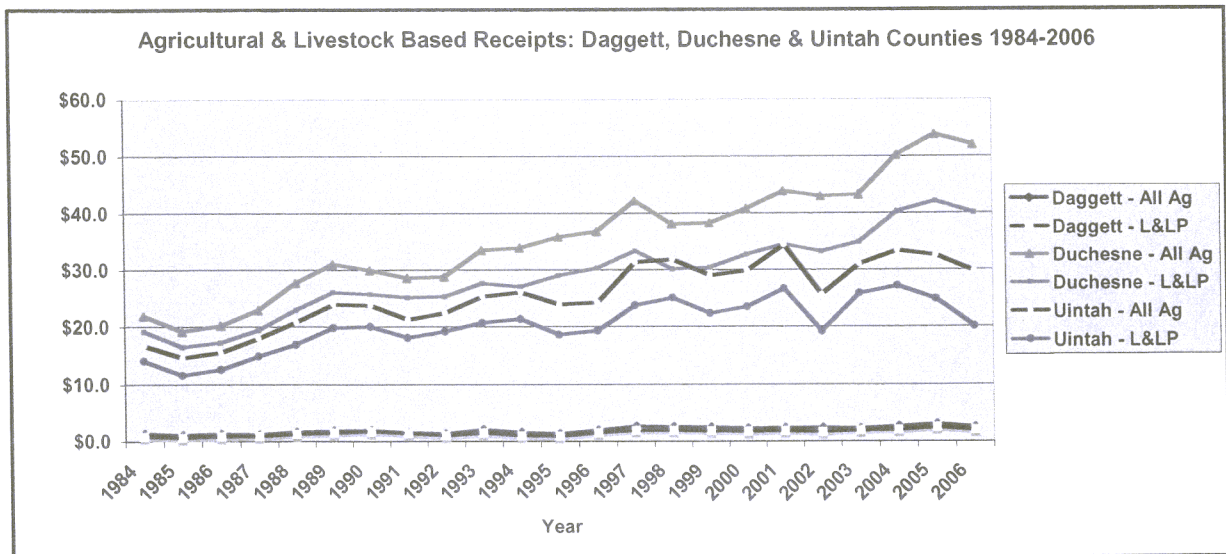
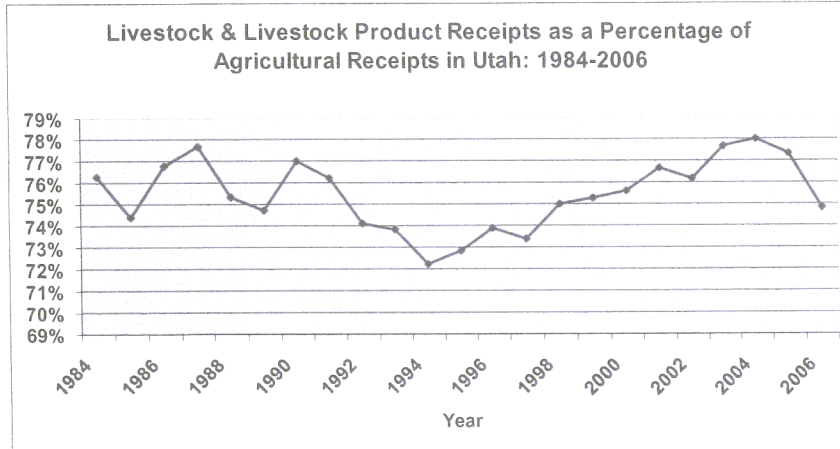
Receipts related to the livestock industry in Utah, Daggett, Duchesne and Uintah Counties 1984-2006.

1. Receipts from Utah livestock and livestock products have doubled in nominal terms since 1984.
2. Receipts (nominal) of livestock and livestock products represent an average of 75% (range 72%-79%) of all agricultural receipts in Utah over the last 23 years.
3. Daggett, Duchesne and Uintah County livestock and livestock product receipts (nominal) have increased from around \$0.6 million annually in Daggett County, \$16.5 million in Duchesne County and \$11.6 million in Uintah County to about \$2.5 million, \$43.1 million and \$27.1 million in Daggett, Duchesne and Uintah Counties respectively, over the past 20-23 years. This represents an increase of 317% in Daggett County, 161% in Duchesne County and a 134% increase in Uintah County in nominal terms.

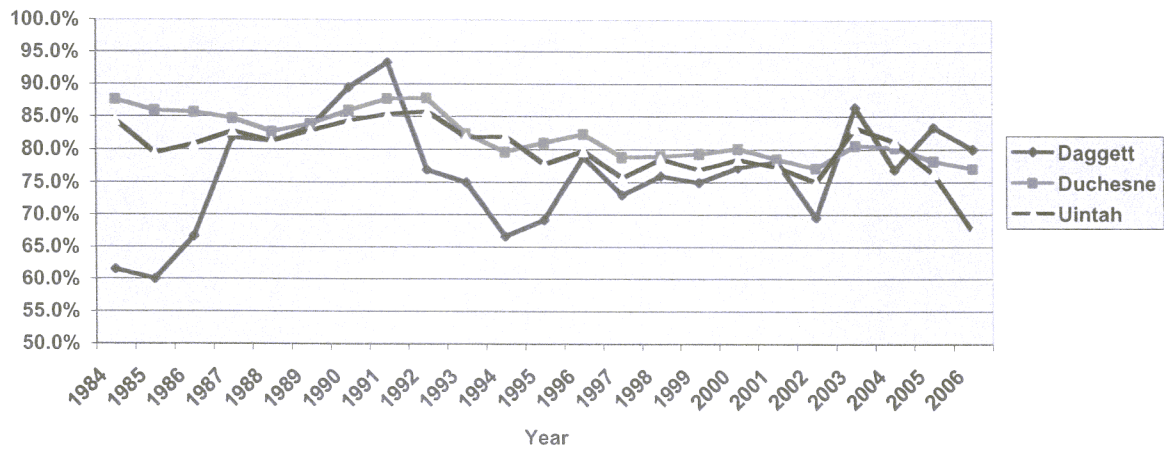
4. Receipts (nominal) of livestock and livestock products represent an average of 76% (range 60%-93%) of all agricultural receipts in Daggett County over the last 23 years.
5. Receipts (nominal) of livestock and livestock products represent an average of 82% (range 77%-88%) of all agricultural receipts in Duchesne County over the last 23 years.
6. Receipts (nominal) of livestock and livestock products represent an average of 80% (range 67%-86%) of all agricultural receipts in Uintah County over the last 23 years.

Utah Livestock and Livestock Product Receipts 1984-2006 (Millions of Dollars)

State of	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Utah	773	716	766	801	915	979	1,011	947	956	1,059	1,026	1,017
State of	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	
Utah	1,099	1,186	1,237	1,185	1,268	1,408	1,366	1,470	1,641	1,762	1,578	

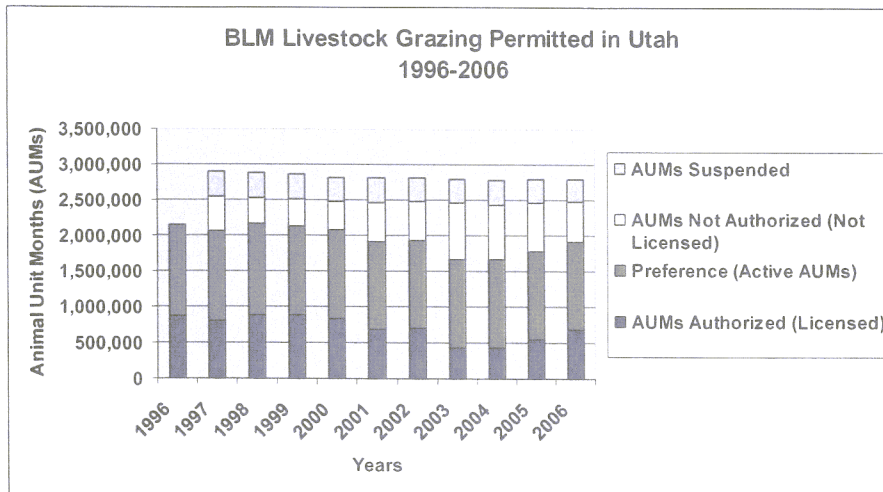


Livestock & Livestock Product Receipts as a Percentage of Agricultural Receipts in Daggett, Duchesne & Uintah Counties: 1984-2006



BLM Livestock Grazing Permitted in Utah 1996-2006

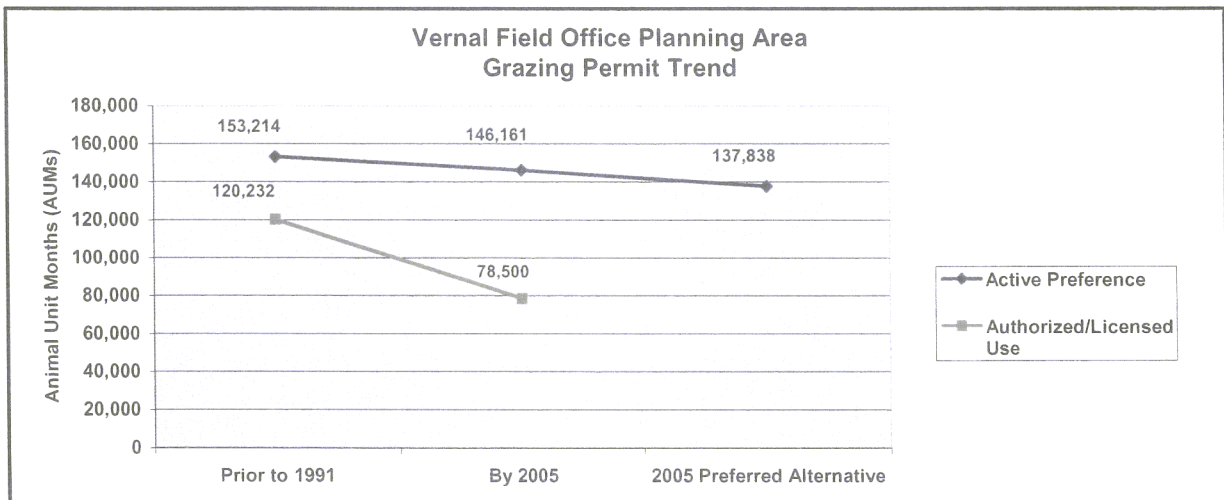
1. There was a general decline (downward trend) in BLM authorized use in Utah from around 1,400,000 AUMs in 1965 to around 800,000 AUMs by 1995 (43% decline) and as low as 435,000 in 2003. Grazing preference has remained relatively stable since 1995 but authorized use has average only around $\frac{2}{3}$ of preference through time. This is partly by choice by the ranchers but also reflects the level of use BLM is willing to license through time or in a given year. Authorized use was restricted significantly (to $\pm\frac{1}{3}$ of preference) statewide during 2003-2005 in response to drought.

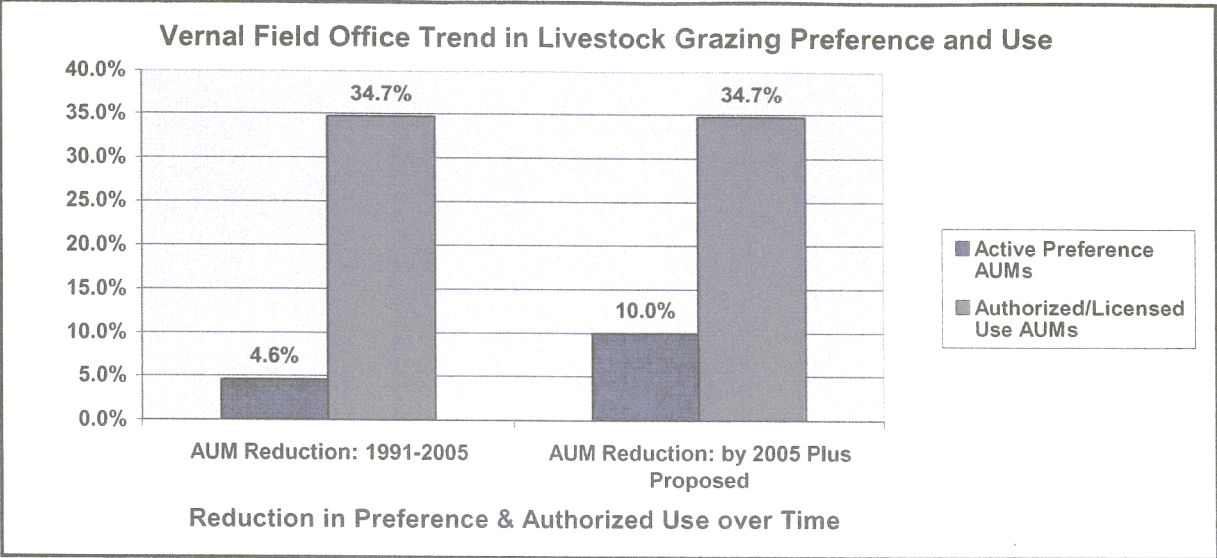


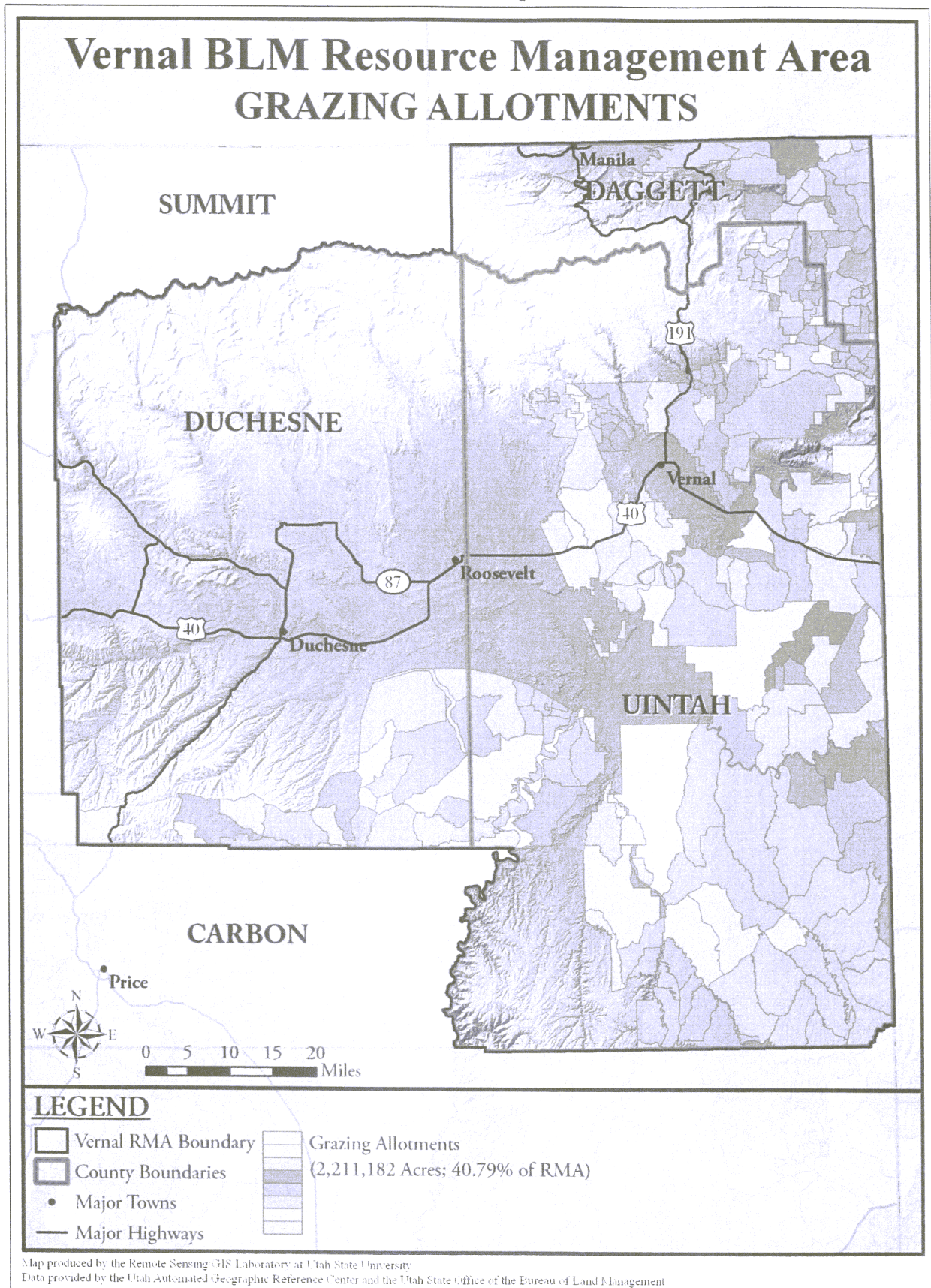
Year	AUMs Authorized (Licensed)	Preference (Active AUMs)	AUMs Not Authorized (Not Licensed)	AUMs Suspended	Number of Permits
1996	868,163	1,280,656	475,018	352,017	1,648
1997	798,881	1,273,899	377,504	352,317	1,641
1998	890,741	1,268,245	376,972	346,383	1,622
1999	880,091	1,257,063	408,165	339,835	1,665
2000	833,715	1,241,880	556,843	347,895	1,593
2001	678,393	1,235,236	534,873	333,768	1,576
2002	703,067	1,237,940	795,938	332,327	1,557
2003	435,406	1,231,344	781,572	333,678	1,543
2004	439,185	1,220,757	692,659	327,801	1,531
2005	544,458	1,237,117	551,738	324,159	1,525
2006	686,267	1,238,005			1,504

Vernal BLM Livestock Grazing Trends

1. The trend in livestock grazing preference and authorized use in the Vernal Field Office Planning Area is downward. Permitted AUM level proposed in the Draft RMP Preferred Alternative is a reduction of 8,323 AUMs, a 5.7% reduction in preference from current the level and a reduction of 15,376 AUMs, a 10% reduction in preference from the level 16 years ago.
2. Suspended Use was frozen at 26,364 AUMs in 1995 with reductions since that point in time lost. Some reinstatement of suspended use is proposed under certain conditions.
3. Authorized/Licensed Use has declined 41,732 AUMs or 35% from the level prior to 1991. Licensed use varies from 78% of preference prior to 1991 to 54% of preference in 2005. This may be due to rancher drought risk management strategies (ranch business risk management) and/or BLM management authority. BLM approves the level of annual use authorized and licensed.
4. Authorized use is not projected into the future under the preferred alternative. However, actions are proposed that will significantly restrict authorized use and possibly preference over the long term. Some of these actions include interpretation of BLM policy guidelines, closing of allotments or portions of allotments for wildlife benefit, recreation, watershed health, erosive soils, riparian enhancement, cultural conflict, "special area" designations including designation of ACECs, recreation areas and extensive/enlarged wildlife protected areas.







ATTACHMENT D

**The Structure and Economic Impact of
Utah's Oil and Gas
Exploration and Production Industry
Phase I - The Uinta Basin**

Prepared for:

Public Land Policy Coordination Office

Utah Governor's Office
5110 State Office Building
P. O. Box 141107
Salt Lake City, Utah 84114

Prepared by:

Bureau of Economic and Business Research

University of Utah
1645 East Campus Center Drive
Salt Lake City, Utah 84112

November 2007

Table of Contents

The Structure and Economic Impact of Utah's Oil and Gas Industry		
1	Executive Summary	1
2	Background	2
3	Utah's Oil and Gas Industry	6
	3.1 Uinta Basin	9
4	Economic Impacts	19
	4.1 Uinta Basin	19
5	Fiscal Impacts	22
	5.1 Uinta Basin	25
6	Technical Notes and Methodology	27
	6.1 NAICS Codes Related to Oil and Gas Production	28
	6.2 Economic Impact Modeling	29
7	References	31

List of Tables

Table 1	U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005	5
Table 2	Land Ownership in the Uinta Basin	10
Table 3	Uinta Basin Crude Oil Production, 1997-2006	10
Table 4	Uinta Basin Natural Gas Production (Gross Withdrawals), 1997-2006 .	11
Table 5	Wells Spudded in the Uinta Basin, 1997-2006	12
Table 6	Uinta Basin Population, 2002-2006	12
Table 7	Employment by Industry in the Uinta Basin, 2006	15
Table 8	Oil and Gas E&P Employment in the Uinta Basin, 2001-2006	16
Table 9	Average Annual Wage by Industry in the Uinta Basin, 2006	18
Table 10	Oil and Gas E&P Average Annual Wages in the Uinta Basin, 2001-2006	19
Table 11	Direct Employment and Wages in the E&P Industry in the Uinta Basin, 2006	20
Table 12	Employment Due to Oil and Gas E&P in the Uinta Basin, 2006	21
Table 13	Wages Due to Oil and Gas E&P in the Uinta Basin, 2006	22
Table 14	Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006	23
Table 15	Distribution of Federal Mineral Royalties in Utah	24
Table 16	State Tax Collections Related to Oil and Gas Production, 2001-2006 .	25
Table 17	Oil and Gas Property Tax Payments in the Uinta Basin, 1997-2006 . . .	26
Table 18	Federal Mineral Royalties Returned by UDOT to the Uinta Basin, 2001-2006	26
Table 19	Royalties Paid for Production on SITLA Lands in the Uinta Basin, 2005-2006	27
Table 20	Personal State Income Taxes due to Oil and Gas E&P in the Uinta Basin	27

List of Figures

Figure 1	Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude . .	2
Figure 2	Average U.S. Wellhead Price of Natural Gas	3
Figure 3	Petroleum Administration for Defense Districts	4
Figure 4	Utah Crude Oil Production	6
Figure 5	Utah Marketed Natural Gas Production	7
Figure 6	Employment and the Unemployment Rate in the Uinta Basin	13

List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Codes
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Industry

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Uinta Basin in eastern Utah. The Uinta Basin, comprising Duchesne and Uintah Counties, is the center of the oil and gas industry in Utah. Rapidly rising energy prices in recent years have stimulated greater production of both crude oil and natural gas in the northern Rocky Mountains, and the Uinta Basin is an integral part of the oil and gas industry in the Rocky Mountain area. The 2006 crude oil production in the Uinta Basin of 11.4 million barrels was a 55 percent increase over a recent low of 7.3 million barrels in 2002. Natural gas production in the area has steadily increased over the past 10 years and reached an all-time high of 226 BCF in 2006.

The rise in oil and gas activity is causing an economic boom in the Uinta Basin. During 2006, the oil and gas exploration and production industry was directly responsible for 19.9 percent of employment and 34.8 percent of total wages in the Uinta Basin. When including indirect and induced impacts due to company and employee spending, the oil and gas industry accounted for 49.5 percent of employment and 60.1 percent of total wages paid in the Uinta Basin during 2006.

The industry also has a sizeable fiscal impact on local governments in the Uinta Basin. Property taxes paid on producing oil and gas wells were \$18.2 million in 2006 and accounted for 38.7 percent of all property taxes paid in the two counties. Federal mineral royalties distributed to the two counties by the Utah Department of Transportation during 2006 amounted to \$30.3 million.

2 Background

The recent rise in the price of gasoline has refocused attention on the energy markets with attention not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China was up over 30 percent from 2002 to 2006. This rise in demand for petroleum products has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

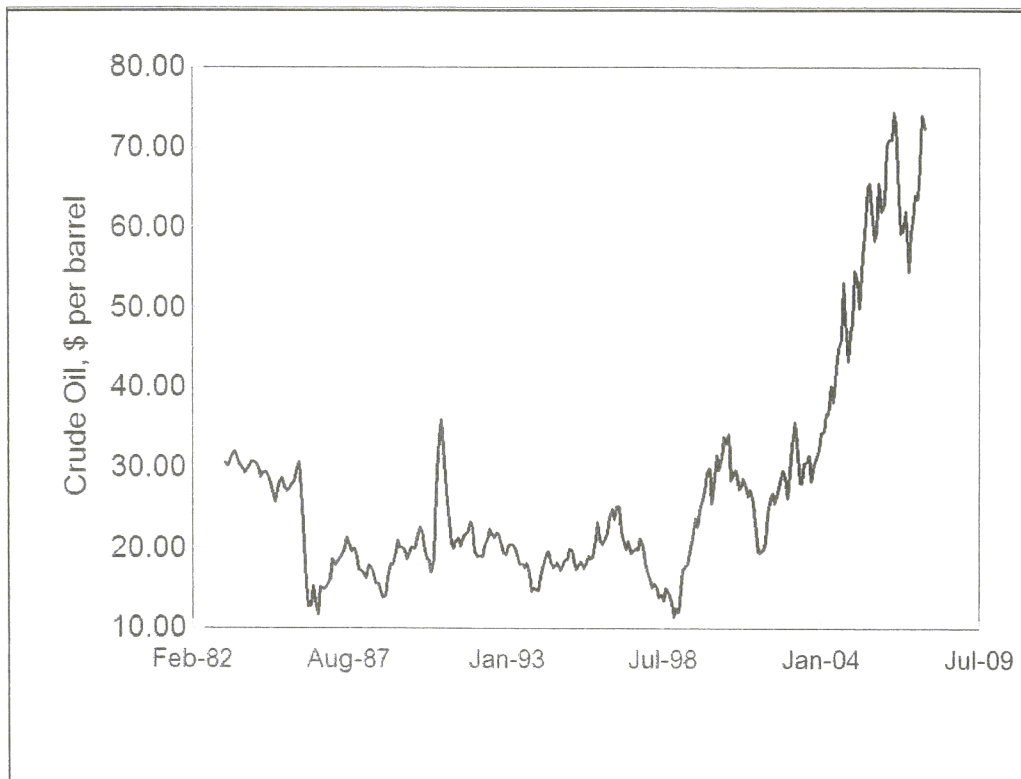


Figure 1 Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude

Source: Energy Information Administration

The price of crude oil was relatively flat during the 1990s with prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to over \$70 per barrel in April 2006 and reached \$79.63 in September

2007. Forecasts expect the crude oil price to remain near current levels in the future. In September 2007 the Energy Information Administration forecast the price of West Texas Intermediate Crude¹ would remain over \$71 per barrel through the end of 2008.

At the same time, natural gas prices have increased from historically low values in the late 1990s to a current price of about \$7 per mcf, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline results in availability of transportation infrastructure having a large influence on natural gas prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountains and wellhead natural gas prices in the area are depressed compared to the rest of the country.

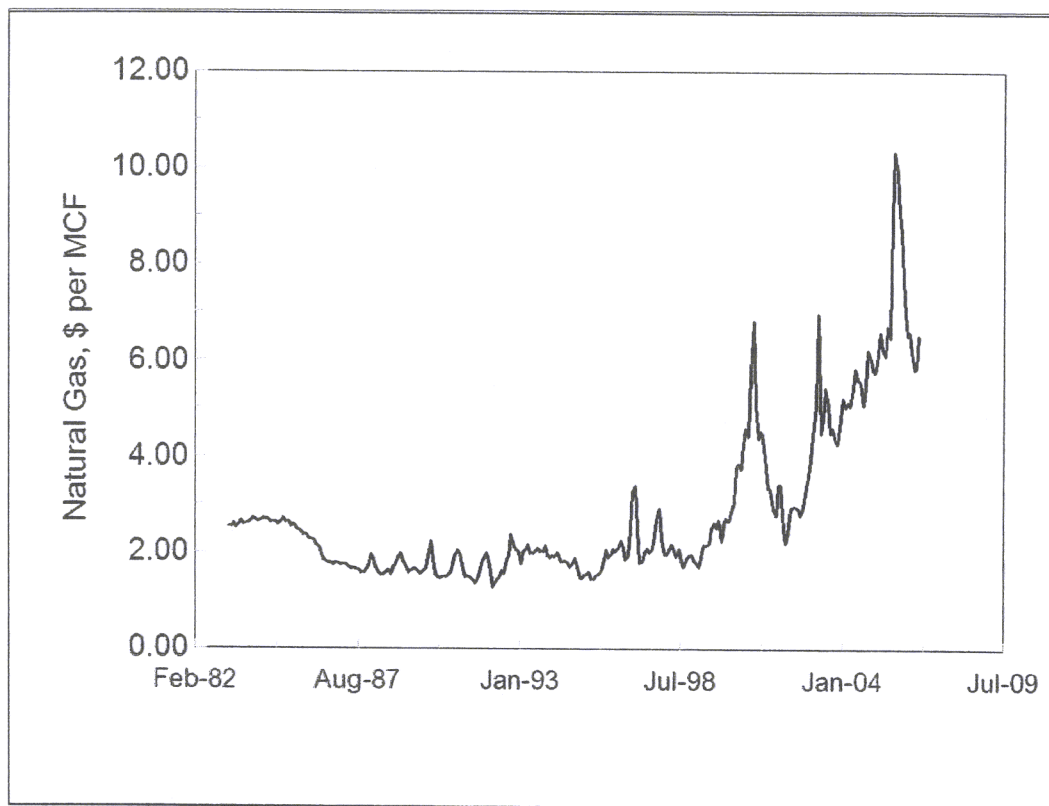


Figure 2 Average U.S. Wellhead Price of Natural Gas
Source: Energy Information Administration

¹West Texas Intermediate (WTI) refers to a crude stream produced in Texas and Oklahoma that is the most common reference or "marker" for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts for light, sweet crude oil.

While increased demand in the Pacific Rim has driven petroleum prices, demand has also increased in the U.S. Domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic crude oil production is dropping due to geologic constraints. The Rocky Mountain states are the only area in the country currently experiencing significant increases in production of crude oil and natural gas. Of the five Petroleum Administration for Defense Districts (PADD) (Figure 3) used for analyzing petroleum data, crude oil and natural gas production are increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).

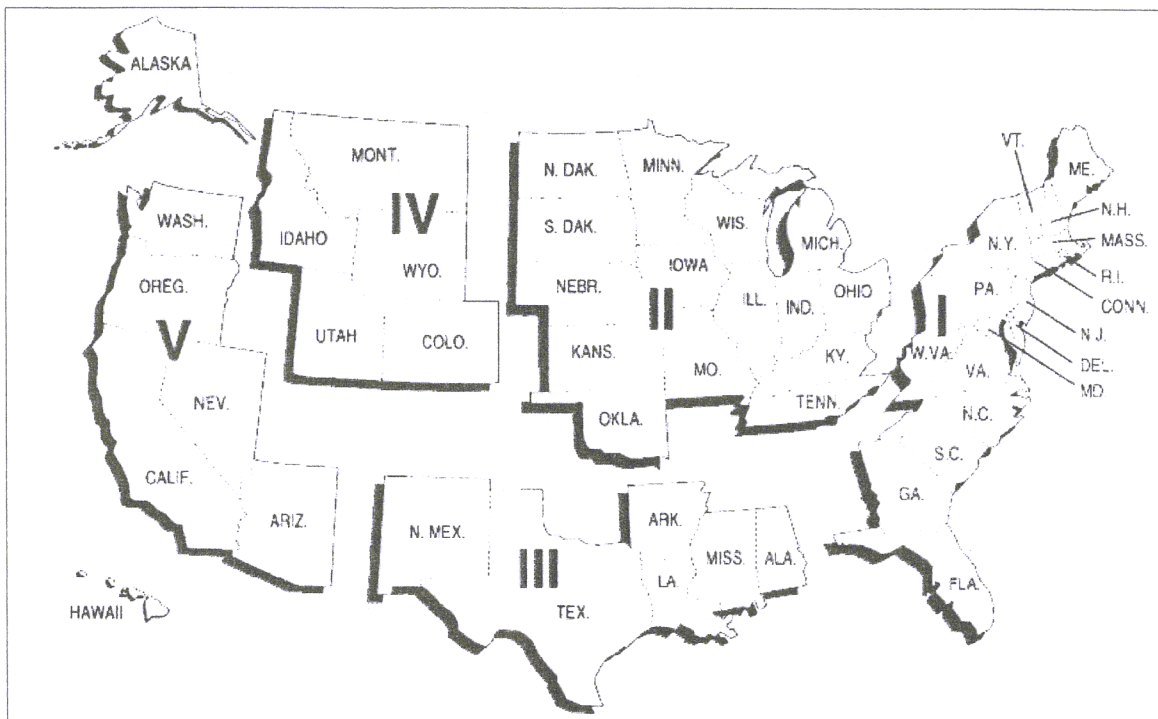


Figure 3 Petroleum Administration for Defense Districts (PADD)
Source: Energy Information Administration

The East Coast is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. From 2002 to 2005, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent while production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent. The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV produced 4.2 percent. By 2005, the amount of domestic gas produced in PADD III had dropped to 62.5 percent of total production while the amount from

PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain states is creating an economic boom in the producing areas.

Table 1 U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
Percent Change, 2002-2005	11.3	(1.9)	(12.8)	20.4	(39.6)	(9.9)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
Percent Change, 2002-2005	15.3	(0.8)	(10.5)	16.4	(1.7)	(4.5)
Source: Energy Information Administration						

Despite the common perception of being vertically integrated, the oil and gas industry is highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few of the operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, and perforating well casings. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These economic benefits beyond direct employment in the exploration and production industry are known as indirect and induced benefits, and are the source of the "multiplier" effect. This study examines the structure of the Utah oil and gas

exploration and production industry and the total economic impact on the producing areas.

3 Utah's Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state's 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006's output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

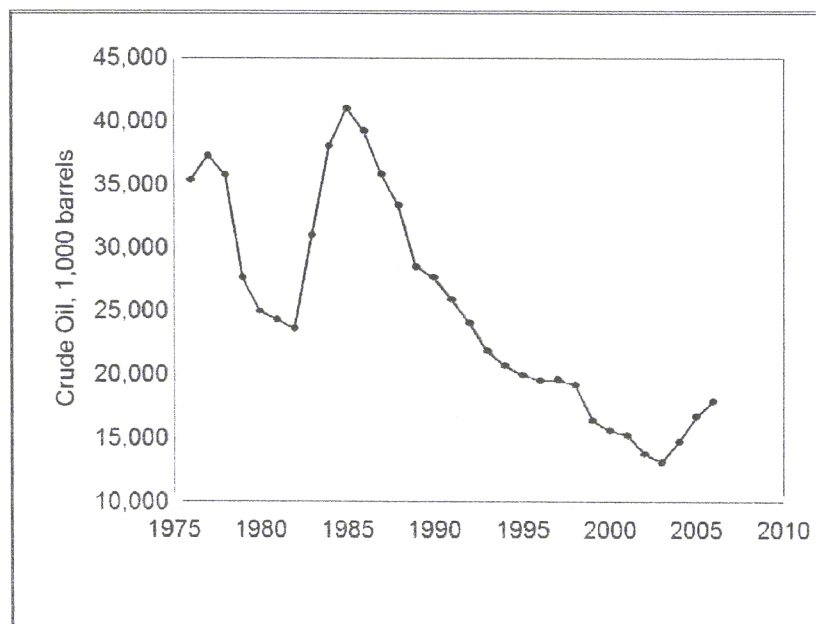


Figure 4 Utah Crude Oil Production
Source: Utah Division of Oil, Gas and Mining

There has been a similar rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from 57 BCF in 1976.

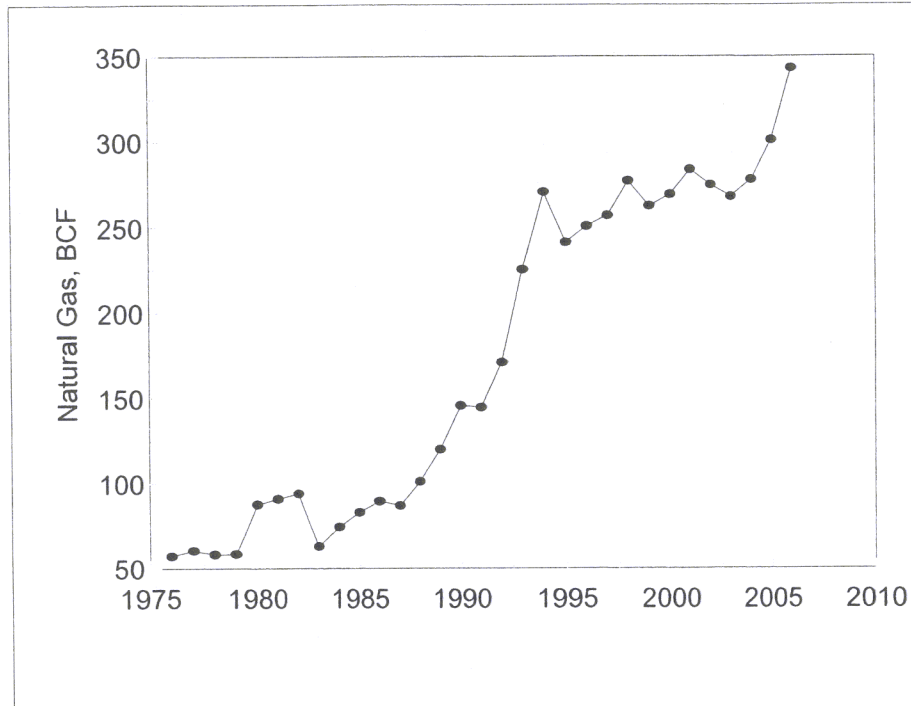


Figure 5 Utah Marketed Natural Gas Production
Source: Utah Geological Survey

Not all gross withdrawals of natural gas are marketed to consumers. Low prices of natural gas during the late 1980s and early 1990s resulted in much of the gas produced in Utah at the time not being marketable. A large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by nonhydrocarbon gases that are removed from the production stream prior to marketing.

Average production per well of both crude oil and natural gas has been declining in Utah, so additional drilling will have to continue to maintain production at current levels. Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF per gas

well in 1962. Natural gas production per gas well steadily declined to 67 MMCF per well in 2000 before rising to 84 MMCF per well in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels per well in 1959 and dropped to 6,727 barrels per well in 2003. Crude oil production per well in Utah was 7,308 barrels during 2006.

During 2006, 129 different operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 203,522,421 MCF.

Six different areas in Utah currently have significant production of oil or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include coalbed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County and the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belts all extend over state lines to adjacent states. Many of the workers involved in operating wells in these areas are actually employed in other states. Coalbed methane operations in Carbon and Emery Counties and the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the North American Industry Classification System (NAICS) developed by the Office of Management and Budget for classifying industries for reporting employment and earnings. The NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary.

The NAICS codes have three industrial classifications that directly apply to the oil and gas E&P industry. These are NAICS 211 - Oil and Gas Extraction, NAICS 213111 - Drilling Oil and Gas Wells, and NAICS 213112 - Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarize oil and gas production in Duchesne and Uintah Counties. Also included are economic data for Duchesne and Uintah Counties to place the oil and gas E&P industry in context.

3.1 Uinta Basin

The Uinta Basin in northeastern Utah is the largest oil and gas producing area in the state and a significant producer in the Rocky Mountains. Natural gas was first discovered in economic quantities in the Uinta Basin in 1925 at the Ashley Valley field. In 1949, oil was discovered in the Roosevelt field. Natural gas and crude oil have been produced in the Uinta Basin since then, although production and the accompanying economic impact have varied with prices. The Uinta Basin is currently experiencing a significant economic boom due to increased oil and gas activity. This boom should continue as long as energy prices remain at current or higher levels.

Although the geologic area defined as the Uinta Basin extends into Colorado and includes portions of several other Utah counties (Carbon, Emery, Grand, Wasatch, and Utah), this study focuses on Duchesne and Uintah Counties, Utah. Economic data is released at the county level and almost all of the economic activity associated with E&P activities in the Uinta Basin occurs in these two counties. For this study, the term Uinta Basin refers to Duchesne and Uintah Counties, collectively unless otherwise indicated.

The two counties contain just under five million acres (Table 2), with 54 percent of the land controlled by the federal government. After including land controlled by the state government and Indian lands, only 21.8 percent of the Uinta Basin is privately owned. With such a large portion of the land controlled by the federal government, the oil and gas E&P industry is highly sensitive to changes in federal land management policy. The largest amount of federal land in the Uinta Basin is controlled by the Bureau of Land Management, which is responsible for 32.7 percent of the land in the two counties. An additional 14.6 percent is administered by the U.S. Forest Service. Lesser amounts are controlled by the U.S. Fish and Wildlife Service and the National Park Service.

The majority of the state land in the basin is controlled by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA administers six percent of the land in the two counties. Lesser amounts are controlled by the Utah Division of Wildlife Resources and the Utah Division of State Parks and Recreation. Indian lands make up 16 percent of the Uinta Basin.

Table 2 Land Ownership in the Uinta Basin

	Duchesne County, acres	Uintah County, acres	Uinta Basin Total, acres	Percent of Total
Bureau of Land Management	206,552	1,411,944	1,618,496	32.7
US Forest Service	453,680	269,380	723,060	14.6
National Wildlife Refuge	0	8,975	8,975	0.2
USFS and BLM Wilderness	263,882	0	263,882	5.3
National Park Service	0	50,682	50,682	1.0
Total Federal	924,115	1,740,981	2,665,096	53.9
State Parks	3,723	956	4,679	0.1
State Wildlife Lands	76,206	9,707	85,913	1.7
State Trust Lands	54,357	240,602	294,959	6.0
Total State Lands	134,287	251,264	385,551	7.8
Indian Lands	395,848	423,353	819,201	16.6
Private	614,070	461,646	1,075,716	21.8
Total	2,068,318	2,877,244	4,945,562	100.0
Source: Utah Governor's Office of Planning and Budget				

Production of both crude oil and natural gas have increased in recent years in the Uinta Basin (Tables 3-4). From a low of 7.3 million barrels in 2002, crude oil production in the two counties increased to 11.4 million barrels in 2006. Production is rising faster in the Uinta Basin than in Utah as a whole. While crude oil production increased 55.5 percent in the basin from 2002 to 2006, production in the state as a whole increased by 30.2 percent. In 1997, 48.5 percent of the crude oil produced in Utah came out of the basin. By 2006, the amount of the state's crude oil production originating in the Uinta Basin had increased to 63.4 percent.

Table 3 Uinta Basin Crude Oil Production, 1997-2006

	Crude Oil, barrels			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	6,358,598	3,147,423	9,506,021	19,592,548
1998	6,268,634	2,940,615	9,209,249	19,223,542
1999	4,697,532	2,637,875	7,335,407	16,376,521
2000	4,772,096	2,788,908	7,561,004	15,609,030
2001	4,980,167	3,195,205	8,175,372	15,273,926
2002	4,291,457	3,016,376	7,307,833	13,770,860
2003	4,341,306	3,069,047	7,410,353	13,098,424
2004	5,838,429	3,776,762	9,615,191	14,799,208
2005	6,670,272	4,371,478	11,041,750	16,675,302
2006	6,401,299	4,959,425	11,360,724	17,926,580
Percent of State Total, 2006	35.7	27.7	63.4	100.00
Source: Utah Division of Oil, Gas and Mining				

The rise in natural gas production has been even more dramatic than that of crude oil. Over the past 10 years, gas production from the basin has steadily grown from 81 BCF in 1997 to 226 BCF in 2006, a 178 percent increase (Table 4). Uintah County has been the site of most of this growth. Production in Uintah County increased by 236 percent from 1997 to 2006, and the county was responsible for 57.1 percent of the natural gas produced in Utah during 2006.

Table 4 Uinta Basin Natural Gas Production (Gross Withdrawals), 1997-2006

	Natural Gas, MCF			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	20,631,221	60,599,426	81,230,647	272,553,774
1998	19,204,848	70,621,273	89,826,121	297,503,246
1999	15,352,521	72,154,481	87,507,002	277,494,312
2000	13,934,444	83,100,193	97,034,637	281,170,016
2001	13,933,698	93,909,207	107,842,905	300,975,578
2002	12,476,159	104,385,705	116,861,864	293,030,004
2003	11,954,655	111,241,438	123,196,093	287,141,238
2004	14,641,315	132,454,516	147,095,831	293,735,994
2005	20,089,535	163,830,925	183,920,460	313,465,305
2006	22,525,615	203,522,421	226,048,036	356,361,028
Percent of State Total, 2006	6.32	57.11	63.43	100.0
Source: Utah Division of Oil, Gas and Mining				

The rising production is reflected in increased drilling activity in Duchesne and Uintah Counties (Table 5). From a low of 150 oil and gas wells spudded in the basin during 1999, the number increased to 933 wells spudded in 2006. As with production, drilling activity in Utah is focused in the Uinta Basin. During 2006, of a total of 1,056 oil and gas wells spudded in Utah, 88.3 percent were drilled in the Uinta Basin.

Table 5 Wells Spudded in the Uinta Basin, 1997-2006

	Wells Spudded			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	160	154	314	430
1998	123	186	309	430
1999	10	140	150	283
2000	63	289	352	540
2001	74	386	460	627
2002	44	226	270	391
2003	89	333	422	480
2004	166	441	607	659
2005	183	569	752	889
2006	279	654	933	1,057
Percent of State Total, 2006	26.4	61.9	88.3	100.00

Source: Utah Division of Oil, Gas and Mining

While production of both crude oil and natural gas is increasing in the Uinta Basin, this increase must be placed in the context of the total economy for the two counties.

The Uinta Basin had an estimated 2006 population of 43,332, up 6.1 percent from 2002 (Table 6). Major cities included Vernal, with an estimated 2006 population of 8,163, Roosevelt (4,681), Duchesne (1,506) and Naples (1,502). The 2000 Decennial Census determined that 39.3 percent of the population lives in the two urban areas of Vernal and Roosevelt. The remainder of the two counties is not densely enough populated to be considered urban.² Although they contained almost 40 percent of the population of the two counties, the two urban areas account for only 0.18 percent of the land area in the Uinta Basin.

Table 6 Uinta Basin Population, 2002-2006

	Population			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
2002	14,856	25,984	40,840	2,358,330
2003	14,698	26,019	40,717	2,413,618
2004	14,933	26,224	41,157	2,469,230
2005	15,237	26,883	42,120	2,547,389
2006	15,585	27,747	43,332	2,615,129

Source: Utah Population Estimates Committee

²The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a population density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet additional criteria established by the Bureau of the Census.

The Uinta Basin is benefitting economically from the oil and gas boom; its unemployment rate has consistently been lower than the state average since August 2005. As energy prices have increased, employment in the Uinta Basin has risen, from approximately 14,500 persons in 1997 to over 25,000 persons in mid-2007 (Figure 6). The unemployment rate in the area has declined since the middle of 2002 after reaching a high of 10.1 percent in February 1999.

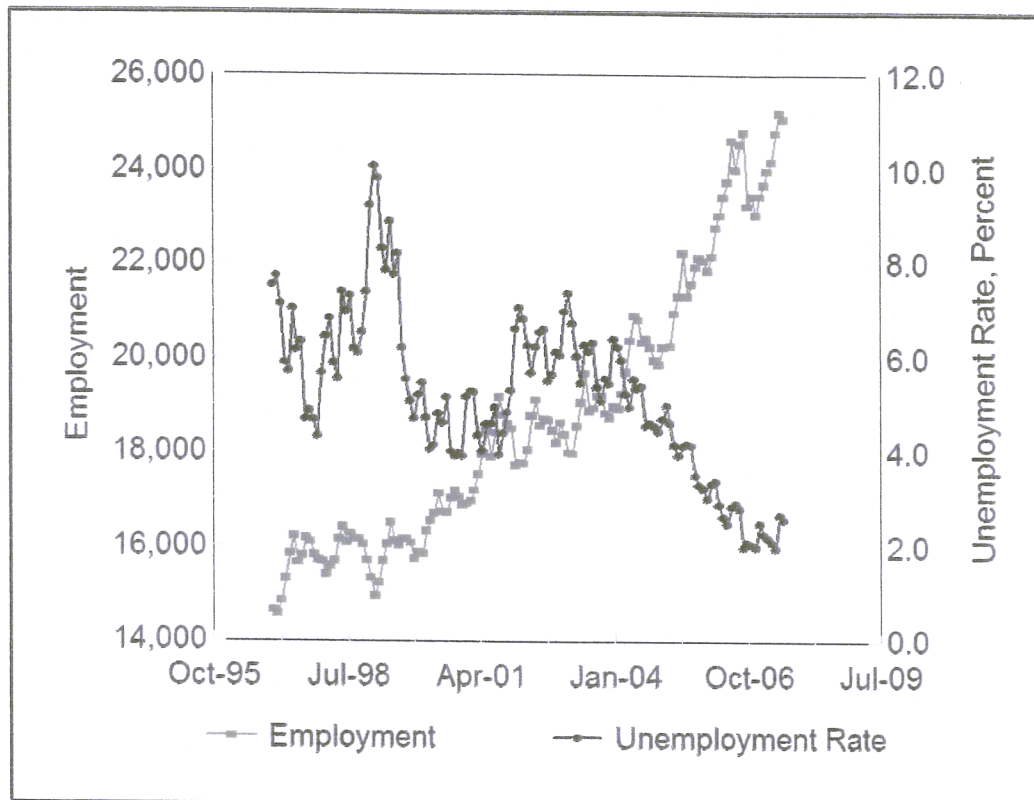


Figure 6 Employment and the Unemployment Rate in the Uinta Basin
Source: BLS, Local Area Unemployment Statistics

The industrial structure of the basin is significantly different from that of the state of Utah (Table 7). Mining, which includes oil and gas production, is responsible for over 20 percent of the employment in the Uinta Basin, compared with 0.9 percent of employment in Utah. The Uinta Basin is nearly 25 times more dependent on the mining industry for employment than is Utah as a whole, as indicated by a location quotient of 24.9³. While the majority of mining employment in the basin is due to oil and gas production, there are other mining operations present. Significant mining operations in the Uinta Basin other than oil and gas extraction are the SF

³Location Quotients are the ratio of an industry's share of employment in a study area, in this case the Uinta Basin, to its share in a reference area, e.g., the state of Utah.

Phosphates Ltd. mine north of Vernal and three gilsonite operations by American Gilsonite, Lexco, Inc., and Ziegler Mineral and Chemical. These other mining operations in the Uinta Basin employ an estimated 270 persons.

Other differences in industrial structure include a much lower reliance on Manufacturing and Educational Services for employment and a higher percentage of employment in Utilities, Transportation, Agriculture, Forestry, Fishing and Hunting, Real Estate and Government. The fairly high location quotient for Utilities, 2.60, is largely due to the presence of the Deseret Power Bonanza Power Plant south of Vernal. Transportation and Warehousing also has a high location quotient of 1.71. Much of the crude oil produced in the Uinta Basin contains a wax that solidifies below 105 F. This results in difficulties in shipping the crude oil to refineries via pipeline so the oil must be sent by tank truck. Government is commonly a significant employer in areas with large amounts of public land due to the presence of federal land-managing agencies.

Industries with low location quotients in the Uinta Basin include Manufacturing and Educational Services. Manufacturing has a location quotient of 0.18, indicating that the basin is only 18 percent as dependent on Manufacturing for employment as is the state of Utah. Similarly, the location quotient for Educational Services is 0.13, suggesting that there are few private educational facilities in the Uinta Basin.

Several major industries have employment data that is nondisclosable for Duchesne or Uintah Counties. This is done to protect individual company data. These industries are Management of Companies and Enterprises (NAICS 55), Administrative and Support Services (NAICS 56), Arts, Entertainment and Recreation (NAICS 71), and Accommodation and Food Services (NAICS 72). Since employment numbers are not available for these industries, location quotients can not be calculated. Data for these industries are included in the total employment figures.

Table 7 Employment by Industry in the Uinta Basin, 2006

	Duchesne County	Uintah County	Uinta Basin	Distribution, Percent	Location Quotient
Private Employment					
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	37	77	114	0.6	1.51
Mining (NAICS 21)	981	3,248	4,229	21.3	24.92
Utilities (NAICS 22)	44	134	178	0.9	2.60
Construction (NAICS 23)	645	834	1,479	7.5	0.92
Manufacturing (NAICS 31-32)	151	224	375	1.9	0.18
Wholesale Trade (NAICS 42)	129	532	661	3.3	0.87
Retail Trade (NAICS 44-45)	752	1,471	2,223	11.2	0.93
Transportation and Warehousing (NAICS 48-49)	522	718	1,240	6.2	1.71
Information (NAICS 51)	172	143	315	1.6	0.59
Finance and Insurance (NAICS 52)	119	180	299	1.5	0.33
Real Estate (NAICS 53)	51	352	403	2.0	1.35
Professional, Scientific and Technical Services (NAICS 54)	79	339	418	2.1	0.40
Management of Companies and Enterprises (NAICS 55)	ND	ND	ND	ND	ND
Administrative and Support (NAICS 56)	ND	ND	ND	ND	ND
Educational Services (NAICS 61)	20	22	42	0.2	0.13
Health Care (NAICS 62)	446	831	1,277	6.4	0.74
Arts, Entertainment and Recreation (NAICS 71)	ND	59	ND	ND	ND
Accommodation and Food Services (NAICS 72)	ND	883	ND	ND	ND
Other Services (NAICS 81)	157	344	501	2.5	1.01
Government Employment	1,716	2,577	4,293	21.6	1.32
Total Employment	6,560	13,292	19,852	100.0	1.00

ND: Not disclosed to protect individual company information. Data are included in the totals.

Source: BLS, Quarterly Census of Employment and Wages

Direct employment in the oil and gas E&P industry has been rising in recent years as increased production was stimulated by higher energy prices (Table 8). The employment for oil and gas extraction is not disclosed for Duchesne County to protect individual company data. However, employment for this industry is estimated at 452 individuals for 2006⁴. Estimated employment by the oil and gas E&P industry is therefore estimated at 974 persons in Duchesne County and was 2,985 persons in Uintah County during 2006. The direct employment of 3,959 persons in the oil and gas E&P industry accounts for 19.9 percent of the total 2006 employment of 19,852 persons in the Uinta Basin.

Table 8 Oil and Gas E&P Employment in the Uinta Basin, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations	Total Oil and Gas Direct Employment
Duchesne County				
2001	ND	138	223	GT 361
2002	ND	140	203	GT 343
2003	ND	57	205	GT 262
2004	ND	58	237	GT 295
2005	ND	68	307	GT 375
2006	ND	102	420	GT 522
Uintah County				
2001	68	368	940	1,376
2002	76	278	973	1,327
2003	181	441	943	1,564
2004	186	508	1,136	1,830
2005	206	587	1,461	2,254
2006	278	913	1,794	2,985
GT: Greater Than				
ND: Not disclosable to protect individual company data.				
Source: BLS, Quarterly Census of Employment and Wages				

Total Uintah County employment in the three NAICS industries involved in oil and gas production increased by 117 percent from 2001 to 2006. Total employment for Duchesne County over time is difficult to discern due to employment for Oil and Gas Extraction (NAICS 211) not being nondisclosed. Duchesne County employment in

⁴For 2006, the BLS lists total Mining (NAICS 21) employment as 981. Of the three subcategories at the three-digit NAICS level, employment is nondisclosable for Oil and Gas Extraction (NAICS 211) and Mining, Other than Oil and Gas (NAICS 212). Employment for Support Activities for Mining (NAICS 213) is reported as 522. The Utah Department of Workforce Services reports only one firm, with an employment between 5 and 9 persons, in NAICS 212 operating in Duchesne County. By subtraction, employment for Oil and Gas Extraction is between 450 and 454 with an expected value of 452.

well drilling (NAICS 213111) and service companies (NAICS 213112) increased by 46 percent from 2001 to 2006. Well-drilling employment actually declined over the period, though it increased from 2003 to 2006. Well drilling employment can decrease in the Uinta Basin while actual drilling activity increases due to companies located outside of Utah drilling wells in the basin.

The large percentage rise in the number of operating company employees in Uintah County indicates increased industry focus on the Uinta Basin. From 2001 to 2006, the number of persons working for operating companies (NAICS 211) in Uintah County increased by 309 percent. Over the same time frame, the number of establishments in the industry in Uintah County increased from 7 to 12. This is the number of companies reporting employment in the county and does not correspond to the number of companies operating wells in the area. Since much of the work in operating the wells is contracted out to different companies, there are many companies that have wells in the Uinta Basin that do not have full-time employees in the area. Therefore, although only 12 operating companies reported employment in the area during 2006, 54 companies reported production to the Utah Division of Oil, Gas and Mining.

The lack of vertical integration in the E&P industry is demonstrated by the distribution of employment through the three industries involved in oil and gas production. Most of the direct employment in oil and gas production is actually in the oil services industry (NAICS 213112). This industry accounted for 56 percent of E&P employment in the Uinta Basin in 2006. The drilling companies (NAICS 213111) employed 26 percent of the persons working in E&P in the basin during 2006. The operating companies that own the wells and production were responsible for only 18 percent of oil and gas production employment in the Uinta Basin in 2006.

In addition to accounting for a large portion of employment in the Uinta Basin, mining also offers some of the highest paying jobs in the area (Table 9). In both Duchesne and Uintah Counties, Mining jobs pay approximately \$63,000 per year on average. In the two counties, only Utilities in Uintah County pays a higher annual wage. The average Utility position in Uintah County paid \$82,676 in 2006. This is a result of the Deseret Power Bonanza Power Plant located south of Vernal. For comparison, the average Utility job in Duchesne County paid \$31,471 in 2006.

Mining jobs in the two counties pay significantly higher than the average wage in the area. In Duchesne County, the average mining job paid \$63,057 during 2006, 83 percent greater than the average annual wage in the county of \$34,538. Similarly, in Uintah County, the average person working in the mining industry earned \$63,963 during 2006, 64 percent higher than the average wage in the county of \$39,056.

The lowest paying private industries in the two counties are Agriculture, Forestry, Fishing and Hunting, Educational Services, Arts, Entertainment and Recreation and Accommodation and Food Services. Each of these industries pays an average wage of less than \$20,000 annually in the Uintah Basin.

Table 9 Average Annual Wages by Industry in the Uinta Basin, 2006

	Duchesne County	Uintah County
Private Employment		
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	\$18,232	\$17,530
Mining (NAICS 21)	63,057	63,963
Utilities (NAICS 22)	31,471	82,676
Construction (NAICS 23)	34,223	32,423
Manufacturing (NAICS 31-32)	33,950	25,420
Wholesale Trade (NAICS 42)	43,791	45,875
Retail Trade (NAICS 44-45)	19,062	21,257
Transportation and Warehousing (NAICS 48-49)	51,961	55,044
Information (NAICS 51)	33,893	25,369
Finance and Insurance (NAICS 52)	26,983	32,425
Real Estate (NAICS 53)	19,385	56,548
Professional, Scientific and Technical Services (NAICS 54)	37,440	36,420
Management of Companies and Enterprises (NAICS 55)	ND	ND
Administrative and Support (NAICS 56)	ND	ND
Educational Services (NAICS 61)	3,604	17,603
Health Care (NAICS 62)	31,236	23,552
Arts, Entertainment and Recreation (NAICS 71)	ND	7,411
Accommodation and Food Services (NAICS 72)	ND	10,044
Other Services (NAICS 81)	26,803	27,602
Government Employment	28,618	31,983
All Employment	34,538	39,056
ND: Not disclosed to protect individual company information.		
Source: BLS, Quarterly Census of Employment and Wages		

Wages in the E&P industry in the Uinta Basin are higher than the average wage and in line with mining wages in general. Of the three NAICS industries related to E&P, the highest wages are paid by the operating companies (Table 10). The average wage paid by companies in the Oil and Gas Extraction industry (NAICS 211) was \$84,795 in Uintah County during 2006. The data for Duchesne County is not disclosed, but the average wage should be similar to that paid in Uintah County. The oil service companies (NAICS 213112) pay the lowest wages of the three NAICS industries related to E&P activities. However, they are still noticeably above the average wage for the area.

Wages for the three NAICS industries involved in oil and gas E&P have been rising in recent years, reflecting increased demand for labor in the area related to rising production. Since a low in 2002 the average wage paid by the oil service companies

increased by 44 percent in Uintah County and by 25 percent in Duchesne County. Similarly, the average wage paid by drilling companies rose by 54 percent in Uintah County and by 9 percent in Duchesne County. Wages paid by the operating companies are also increasing, with a 59 percent rise from 2002 to 2006 in Uintah County.

Table 10 Oil and Gas E&P Average Annual Wages in the Uinta Basin, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Duchesne County			
2001	ND	\$61,423	\$44,412
2002	ND	54,949	42,709
2003	ND	49,464	43,903
2004	ND	51,245	43,270
2005	ND	62,037	48,194
2006	ND	59,726	53,585
Uintah County			
2001	\$98,933	\$46,287	\$44,948
2002	53,149	45,776	40,318
2003	61,838	48,404	44,230
2004	66,627	55,208	47,845
2005	75,598	65,041	49,770
2006	84,795	70,704	58,129
ND: Not disclosed to protect individual company data.			
Source: BLS. Quarterly Census of Employment and Wages			

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Uinta Basin

The Uinta Basin is the center of the oil and gas E&P industry in Utah. As such, the oil and gas industry is a major factor in the area’s economy and is responsible for

a major portion of employment in the two counties. Direct employment in the E&P industry accounted for nearly 20 percent of total employment and 35 percent of total wages paid during 2006 (Table 11)⁵. Uintah County is more dependent upon the oil and gas industry for employment than is Duchesne County. Many of the company offices are located in Vernal but they do business in both counties.

Table 11 Direct Employment and Wages in the E&P Industry in the Uinta Basin, 2006

	Duchesne County		Uintah County		Uinta Basin Total	
	Employment	Wages, 1,000	Employment	Wages, 1,000	Employment	Wages, 1,000
Total	6,560	\$226,561	13,292	\$519,112	19,852	\$745,683
E&P Industry, Direct	974	66,904	2,985	192,338	3,959	259,242
E&P Industry, percent of total	14.8	29.5	22.5	37.0	19.9	34.8

Source: BLS, Quarterly Census of Employment and Wages; author's estimates.

In addition to the direct employment, additional jobs and wages due to spending by the industry and employees results in significant economic benefits to the Uinta Basin. Other employment due to spending by the E&P industry is not limited to the mining industry but is distributed throughout different industries. Total employment in the Uinta Basin due to the E&P industry, including direct, indirect, and induced, was estimated at 49.5 percent of total jobs in the area in 2006 (Table 12). When examining employment by industry, the oil and gas industry is shown to have significant effects on in several other industries.

The E&P industry is responsible for large portions of employment in Retail Trade, Transportation and Warehousing, Real Estate and Other Services. The RIMS II Input-Output model used to determine economic impacts calculates employment by industry irrespective of type of ownership, i.e., private or government employment. However, the BLS figures do segregate private and government employment. The employment due to the oil and gas industry given in Table 12 includes some government employment in the various industries, not just the private employment. Two of the listed industries have significant government employment in addition to the private employment shown Table 12. They are Educational Services and Health Care and Social Assistance. The RIMS II model classifies employees in public education under Educational Services, so the total number of persons employed in this industry is much greater than the 42 persons in private employment listed in Table 12. Other industries with significant levels of public employment are Health Care and Social Assistance and, to a lesser extent, Utilities and Arts, Entertainment and Recreation.

⁵Total wages for Oil and Gas Extraction (NAICS 211) were not released by the BLS for Duchesne County. Total wages were estimated by multiplying the estimated employment of 452 (see Footnote 4) by the average wage for the industry in Uintah County of \$84,795.

Several industries have no government employment in the Uinta Basin. These industries are Agriculture, Forestry, Fishing and Hunting, Mining, Manufacturing, Wholesale Trade, Professional, Scientific and Technical Services, Management of Companies and Enterprises, and Accommodation and Food Services. Although there are government employees located in the Uinta Basin to regulate the oil and gas industry, these are not considered part of the Mining industry. The state Division of Oil, Gas and Mining has four employees in the area and there are also several dozen BLM employees dedicated to regulating the industry. For purposes of employment classification, these employees are considered to be employed in NAICS-92 Public Administration, which is included in the government employment in Table 12.

Table 12 Employment Due to Oil and Gas E&P in the Uinta Basin, 2006

	Uinta Basin Total Employment	Total Employment Due to Oil and Gas E&P	Oil and Gas E&P Employment, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	114	14	12.2
Mining (NAICS 21)	4,229	4,020	95.1
Utilities (NAICS 22)	178	33	18.6
Construction (NAICS 23)	1,479	598	40.4
Manufacturing (NAICS 31-32)	375	185	49.3
Wholesale Trade (NAICS 42)	661	145	22.0
Retail Trade (NAICS 44-45)	2,223	1,558	70.1
Transportation and Warehousing (NAICS 48-49)	1,240	875	70.6
Information (NAICS 51)	315	59	18.8
Finance and Insurance (NAICS 52)	299	142	47.4
Real Estate (NAICS 53)	403	307	76.3
Professional, Scientific and Technical Services (NAICS 54)	418	229	54.8
Management of Companies and Enterprises (NAICS 55)	ND	16	NA
Administrative and Support (NAICS 56)	ND	80	NA
Educational Services (NAICS 61)	42	58	138.7
Health Care (NAICS 62)	1,277	626	49.0
Arts, Entertainment and Recreation (NAICS 71)	ND	49	NA
Accommodation and Food Services (NAICS 72)	ND	427	NA
Other Services (NAICS 81)	501	378	75.5
Households	NA	36	NA
Government Employment	4,293	NA	NA
All Employment	19,582	9,835	49.5
<p>Note: There is significant government employment in both Educational Services and Health Care and Social Assistance in the Uinta Basin. The employment calculated using the RIMS II model, which includes government employment, can exceed the private employment in these industries.</p> <p>ND: Nondisclosable. Data are included in the totals. NA: Not Applicable.</p> <p>Source: BLS, Quarterly Census of Employment and Wages; author's calculations.</p>			

Oil and gas E&P accounts for over 60 percent of all wages paid in the Uinta Basin (Table 13). The industry is responsible for a higher percentage of wages than employment due to oil and gas E&P paying above average wages. In addition to

Mining, industries with a significant portion of wages due to oil and gas extraction include Manufacturing, Retail Trade, Finance and Insurance, Professional, Scientific and Technical Services, and Other Services. As with employment, the amount of wages reported in Educational Services is greater than the wages paid by private employers in that industry. This is due to public schools accounting for a major portion of the employment in the Educational Services. Public schools are not private employment, but government employment, and so their wages are categorized separately in the BLS figures.

Table 13 Wages Due to Oil and Gas E&P in the Uinta Basin, 2006

	Uinta Basin Total Wages, \$1,000	Total Wages Due to Oil and Gas E&P, \$1,000	Oil and Gas E&P Wages, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	2,027	243	12.0
Mining (NAICS 21)	269,605	263,111	97.6
Utilities (NAICS 22)	12,473	2,959	23.7
Construction (NAICS 23)	49,123	24,547	50.0
Manufacturing (NAICS 31-32)	10,808	7,897	73.1
Wholesale Trade (NAICS 42)	30,033	6,886	22.9
Retail Trade (NAICS 44-45)	45,603	35,053	76.9
Transportation and Warehousing (NAICS 48-49)	66,650	34,377	51.6
Information (NAICS 51)	9,457	3,257	34.4
Finance and Insurance (NAICS 52)	9,058	5,683	62.7
Real Estate (NAICS 53)	20,894	11,872	56.8
Professional, Scientific and Technical Services (NAICS 54)	15,049	11,553	76.8
Management of Companies and Enterprises (NAICS 55)	ND	852	NA
Administrative and Support (NAICS 56)	ND	1,836	NA
Educational Services (NAICS 61)	466	1,195	256.5
Health Care (NAICS 62)	33,508	19,975	59.6
Arts, Entertainment and Recreation (NAICS 71)	ND	892	NA
Accommodation and Food Services (NAICS 72)	ND	5,830	NA
Other Services (NAICS 81)	13,690	9,651	70.5
Households	NA	578	NA
Government Employment	131,529	NA	NA
All Employment	745,683	448,246	60.1
<p>Note: There is significant government employment in both Educational Services and Health Care and Social Assistance in the Uinta Basin. The wages calculated using the RIMS II model, which includes government wages, can exceed the private wages in these industries.</p> <p>ND: Not disclosed, NA: Not Applicable.</p> <p>Source: BLS, Quarterly Census of Employment and Wages; author's calculations.</p>			

5 Fiscal Impacts

The oil and gas industry also has fiscal impacts on the local areas. Fiscal impacts refer to impacts on government finances and tax collections. The oil and gas industry is subject to the tax laws common to all business. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment

under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin. Generally, one-half of federal mineral royalties are returned to the states of origin. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have dramatically increased in recent years, to \$299 million in 2006, a 228 percent rise from \$91 million in 2001 (Table 14). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonus and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 14 includes royalties due to oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 14 Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 15). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community

Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 15 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 15 Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index.	
Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries and were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands were \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools as a beneficiary or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an oil and gas severance tax in Utah and an oil and gas conservation fee which are levied on all production in the state. The Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 16). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006 while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the wellhead price of natural gas produced in Utah dropping from \$3.52 per MCF in 2001 to \$1.99 per MCF in 2002. These data reflect statewide oil and gas operations and are not specific to the Uinta Basin.

Table 16 State Tax Collections Related to Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449
Note: Years are state fiscal years.		
Source: Utah State Tax Commission		

5.1 Uinta Basin

The largest direct fiscal impacts on the Uinta Basin due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Property taxes paid on oil and gas properties are a significant portion of total property taxes in the Uinta Basin (Table 16). During 2006, the oil and gas industry paid nearly 40 percent of total property taxes in the two Uinta Basin counties. Table 16 refers to all property taxes paid to various government entities in the two counties, not just the county governments. As prices of crude oil and natural gas have increased in recent years, the net present value of future production has increased. This, coupled with rising production, has resulted in the amount of property taxes paid by the oil and gas industry in the Uinta Basin increasing by nearly four times over the past 10 years, not adjusting for inflation. Oil and gas property taxes have been rising faster in Uintah County than in Duchesne County, reflecting rising natural gas production in the county. Property taxes paid on oil and gas production increased by 440 percent in Uintah County from 1997 to 2006, and by 122 percent in Duchesne County. Given the rising production and expected

continuation of current energy prices, the property taxes paid by the oil and gas production industry in the Uinta Basin should continue to rise into the future.

Table 17 Oil and Gas Property Tax Payments in the Uinta Basin, 1997-2006

	Duchesne County		Uintah County		Uinta Basin Total	
	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax
1997	\$2,412,970	27.2	\$2,389,667	15.7	\$4,802,637	20.0
1998	2,353,888	27.9	2,858,447	18.1	5,212,335	21.5
1999	1,561,466	21.3	2,309,639	15.6	3,871,105	17.5
2000	1,749,689	19.7	2,579,728	16.9	4,329,417	17.9
2001	2,221,385	23.1	3,449,316	20.8	5,670,701	21.7
2002	1,773,249	18.4	4,054,227	22.5	5,827,476	21.1
2003	1,739,101	17.2	4,276,125	21.9	6,015,226	20.3
2004	2,407,040	21.8	5,985,003	25.3	8,392,043	24.2
2005	3,640,044	27.8	8,241,224	33.0	11,881,268	31.2
2006	5,358,661	33.9	12,895,362	41.1	18,254,024	38.7

Source: Utah State Tax Commission, Property Tax Division Annual Reports

The funds generated through federal mineral royalties that are returned to the Uinta Basin through the Utah Department of Transportation are also a significant source of revenue for the local governments. These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2006, Duchesne and Uintah Counties collectively received \$30 million dollars in federal mineral royalties returned to them by the Department of Transportation. This was a 296 percent increase over the amount returned in 2001.

Table 18 Federal Mineral Royalties Returned by UDOT to the Uinta Basin, 2001-2006

	Duchesne County	Uintah County	Uinta Basin Total
2001	\$789,854	\$6,856,410	\$7,646,264
2002	718,112	3,031,081	3,749,193
2003	678,705	6,893,486	7,572,192
2004	931,428	11,767,611	12,699,038
2005	1,903,292	16,704,532	18,607,824
2006	2,750,055	27,500,128	30,250,182

Note: Years are state fiscal years.
Source: Utah Department of Transportation

Table 18 includes data on all royalties from federal mineral leases in Utah, not just oil and gas operations. Although there are some other federal mineral leases in the Uinta Basin, notably gilsonite, by far the majority of royalties are due to oil and gas production.

Royalties paid to SITLA due to production of oil and gas in the Uinta Basin rose significantly from 2005 to 2006 (Table 18). In 2005, oil and gas production in the Uinta Basin resulted in \$23 million in SITLA royalties. Rising production and prices resulted in a 54 percent increase in 2006, with over \$34 million in SITLA royalties paid.

Table 19 Royalties Paid for Production on SITLA Lands in the Uinta Basin, 2005-2006

	Duchesne County	Uintah County	Uinta Basin Total
2005	\$2,976,668	\$19,990,367	\$22,967,035
2006	2,686,706	32,720,101	35,407,575
Note: Years are state fiscal years.			
Source: School and Institutional Trust Lands Administration			

State personal income taxes as a result of oil and gas E&P activities in the Uinta Basin is estimated at just over \$18 million for 2006 (Table 20).

Table 20 Personal State Income Taxes due to Oil and Gas E&P in the Uinta Basin

	Uinta Basin Total
Total Wages due to Oil and Gas E&P, \$1,000	\$448,246
Personal State Income Taxes, \$1,000	18,026
Source: Author's Calculations. Details of the estimation are in Section 6.	

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2002). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, with the services sector becoming a much larger portion of the economy and more complex than when the SIC codes were developed. In the switch, the 10 major industrial sectors under the SIC codes were replaced with 20 major sectors under the NAICS Codes. Many of the industrial sectors under the SIC codes were split among two or more of the redefined sectors under the NAICS codes, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, companies are classified under 20 major industrial categories and the categories are further subdivided as needed. There are three classifications directed related to the oil and gas exploration and production industry.

These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we are considering them collectively as the oil and gas E&P industry.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

6.1 NAICS Codes Related to Oil and Natural Gas Production

For this study, we are considering the following three NAICS classifications collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211 – Oil and Gas Extraction Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111 – Drilling Oil and Gas Wells This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling.

NAICS 213112 – Support Activities for Oil and Gas Operations This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that result in new funds being injected into the economy. Examples include are products that are exported and new construction funding. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside a regional economy, known as residentiary spending, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah. Many similar studies present the total economic output of an activity as the economic impact; this is the sum of all transactions in a supply chain and can be much larger than the value of the final good or service provided to the end consumer. Similarly, many authors apply economic output multipliers to all spending related to an activity, with no distinction between export-based and residentiary spending. The result is often termed “economic contribution” and presented as economic impact. As with all economic output calculations, the result is much larger than the value of the final product delivered to an end consumer.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid. In addition, there are additional indirect and induced impacts. Indirect impacts result from local spending by the E&P industry and induced impacts arise from employees of the E&P industry spending their earnings.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced

impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II Input-Output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in the Uinta Basin. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service-producing industries and wage and salary data for nonservice-producing industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

Data on spending by the E&P industry in the Uinta Basin was obtained via a survey of operating, drilling and service companies operating in the area. Personnel with the Bureau of Economic and Business Research at the University of Utah cooperated with the Independent Petroleum Association of the Mountain States (IPAMS) to develop survey forms with input from several representatives of the petroleum industry. IPAMS distributed the survey forms to operating, drilling and service companies operating in the Uinta Basin and the forms were returned to the Bureau of Economic and Business Research. Data from returned survey forms was totaled by spending category. Using data on total production of oil and gas, number of wells spudded and employment reported by government agencies, the total spending reported by responding companies was expanded to total industry spending in the region. The multipliers from the RIMS II model were then applied to the total spending by category to determine the indirect and induced employment and wages.

State income tax impacts were estimated by calculating the ratio of the Utah income tax liability for Duchesne and Uintah Counties to the total of the total earnings by place of work for the two counties as determined by the Bureau of Economic Analysis. This average of this ratio for the years 2003 through 2005 was 4.02 percent. This ratio was then applied to the total estimated earnings due to oil and gas E&P in the Uinta Basin of \$448,246 thousand to estimate the state personal income tax.

7 References

- Bureau of Economic Analysis. 2007.** Local Area Personal Income. <http://www.bea.gov/regional/reis/>. Downloaded Nov. 6, 2007.
- Bureau of Labor Statistics. 2007.** Quarterly Census of Employment and Wages. <http://stats.bls.gov/cew/home.htm>. Downloaded Sept. 9, 2007.
- Energy Information Administration. 2007.** *Short-Term Energy Outlook September 2007*. <http://www.eia.doe.gov/emeu/steo/pub/contents.html>. Downloaded Sept. 11, 2007.
- Isard, W., I.J. Azis, M.P., Drennan, R.E. Miller, S. Saltzman, and E. Throbecke. 1998.** *Methods of Interregional and Regional Analysis*. Ashgate Publishing Limited. 490 pp.
- Minerals Management Service. 2007.** MRM Statistical Information. <http://www.mrm.mms.gov/MRMWebStats/default.aspx>. Downloaded Oct. 3, 2007.
- Office of Management and Budget. 1997.** *North American Industry Classification System*. 1247 pp.
- Schaffer, W. A. 1999.** *Regional Impact Models*. West Virginia University Regional Research Institute. <http://www.rri.wvu.edu/WebBook/Schaffer/index.html>. Accessed July 18, 2007. 80 pp.
- U.S. Bureau of the Census. 2007.** Subcounty Population Data Sets. <http://www.census.gov/popest/cities/SUB-EST2006-states.html>. Downloaded Sept. 12, 2007.
- Utah Department of Transportation. 2007.** Mineral Lease Distributions. <http://www.dot.utah.gov/main/f?p=100:pg:11808295696151236794:::1:T,V:135,>. Downloaded Oct. 4, 2007.
- Utah Division of Oil, Gas and Mining. 2007.** Production Reports. <http://oilgas.ogm.utah.gov/Publications/Publications.htm>. Downloaded Sept. 12, 2007.
- Utah Geological Survey. 2006.** *Utah! 100 Years of Exploration and Still the Place to Find Oil and Gas*. Public Information Series 71. nonpaginated.
- Utah Governor's Office of Planning and Budget. 2000.** *Federal Land Payments in Utah*. <http://governor.utah.gov/dea/Publications/Report.pdf>. Downloaded Sept. 11, 2007.

Utah State Tax Commission. 2007. Revenue Reports (TC-23).
<http://www.tax.utah.gov/esu/revenue/index.html>. Downloaded Nov. 5, 2007.

Utah State Tax Commission. 2007. Utah Income and Corporate Tax Statistics.
<http://www.tax.utah.gov/esu/income/index.html>. Downloaded Nov. 2, 2007.

ATTACHMENT E

**The Structure and Economic Impact of
Utah's Oil and Gas
Exploration and Production Industry
Phase II - Carbon and Emery Counties**

Prepared for:

Public Land Policy Coordination Office

Utah Governor's Office
5110 State Office Building
P. O. Box 141107
Salt Lake City, Utah 84114

Prepared by:

Bureau of Economic and Business Research

University of Utah
1645 East Campus Center Drive
Salt Lake City, Utah 84112

December 2007

Table of Contents

1	Executive Summary	1
2	Background	2
3	Utah's Oil and Gas Industry	6
	3.1 Carbon and Emery Counties	9
	3.1.1 Carbon and Emery Counties Economy	13
4	Economic Impacts	19
	4.1 Carbon and Emery Counties	19
5	Fiscal Impacts	22
	5.1 Carbon and Emery Counties	25
6	Technical Notes and Methodology	28
	6.1 NAICS Codes Related to Oil and Gas Production	30
	6.2 Economic Impact Modeling	31
7	References	32

List of Tables

Table 1	U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005	5
Table 2	Land Ownership in Carbon and Emery Counties	10
Table 3	Carbon and Emery Counties Crude Oil Production, 1997-2006	11
Table 4	Carbon and Emery Counties Natural Gas Production (Gross Withdrawals), 1997-2006	12
Table 5	Wells Spudded in Carbon and Emery Counties, 1997-2006	13
Table 6	Carbon and Emery Counties Population, 2002-2006	14
Table 7	Employment by Industry in Carbon and Emery Counties, 2006	16
Table 8	Oil and Gas E&P Employment in Carbon and Emery Counties, 2001-2006	17
Table 9	Average Annual Wage by Industry in Carbon and Emery Counties, 2006	19
Table 10	Direct Employment and Wages in the E&P Industry in Carbon and Emery Counties, 2006	20
Table 11	Employment Due to Oil and Gas E&P in Carbon and Emery Counties, 2006	21
Table 12	Wages Due to Oil and Gas E&P in Carbon and Emery Counties, 2006	22
Table 13	Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006	23
Table 14	Distribution of Federal Mineral Royalties in Utah	24
Table 15	State Tax Collections Related to Oil and Gas Production, 2001-2006 .	25
Table 16	Oil and Gas Property Tax Payments in Carbon and Emery Counties, 1997-2006	26
Table 17	Federal Mineral Royalties Returned by UDOT to Carbon and Emery Counties, 2001-2006	26
Table 18	Royalties Paid for Production on SITLA Lands in Carbon and Emery Counties, 2005-2006	27
Table 19	Personal State Income Taxes Due to Oil and Gas E&P in Carbon and Emery Counties	28
Table 20	NAICS Codes Related to the Mining Industry	29

List of Figures

Figure 1	Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude . .	2
Figure 2	Average U.S. Wellhead Price of Natural Gas	3
Figure 3	Petroleum Administration for Defense Districts	4
Figure 4	Utah Crude Oil Production	7
Figure 5	Utah Marketed Natural Gas Production	7
Figure 6	Employment and the Unemployment Rate in Carbon and Emery Counties	14

List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in Carbon and Emery Counties in east-central Utah. Carbon and Emery Counties are an increasingly important center of natural gas production in Utah. Rapidly rising energy prices in recent years have stimulated greater production of both crude oil and natural gas in the northern Rocky Mountains, and the study area is an integral part of the oil and gas industry in the Rocky Mountain area. The study area's natural gas production increased 316 percent from 23.7 BCF in 1997 to 98.5 BCF in 2006.

The rise in oil and gas activity is having a noticeable and positive economic impact on Carbon and Emery Counties. During 2006, the oil and gas exploration and production industry was directly responsible for an estimated 137 jobs and \$6.5 million in wages in the two counties. When including indirect and induced impacts due to company and employee spending, the oil and gas industry accounted for 524 jobs and \$22.2 million in wages in the area. This represents 4.0 percent of total employment and 4.9 percent of total wages in the study area.

The industry also has a sizeable fiscal impact on local governments in the two county area. Property taxes paid on producing oil and gas wells were \$10.2 million in 2006 and accounted for 24.3 percent of all property taxes paid in the two counties. Federal mineral royalties distributed to the two counties by the Utah Department of Transportation during 2006 amounted to \$13.7 million.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

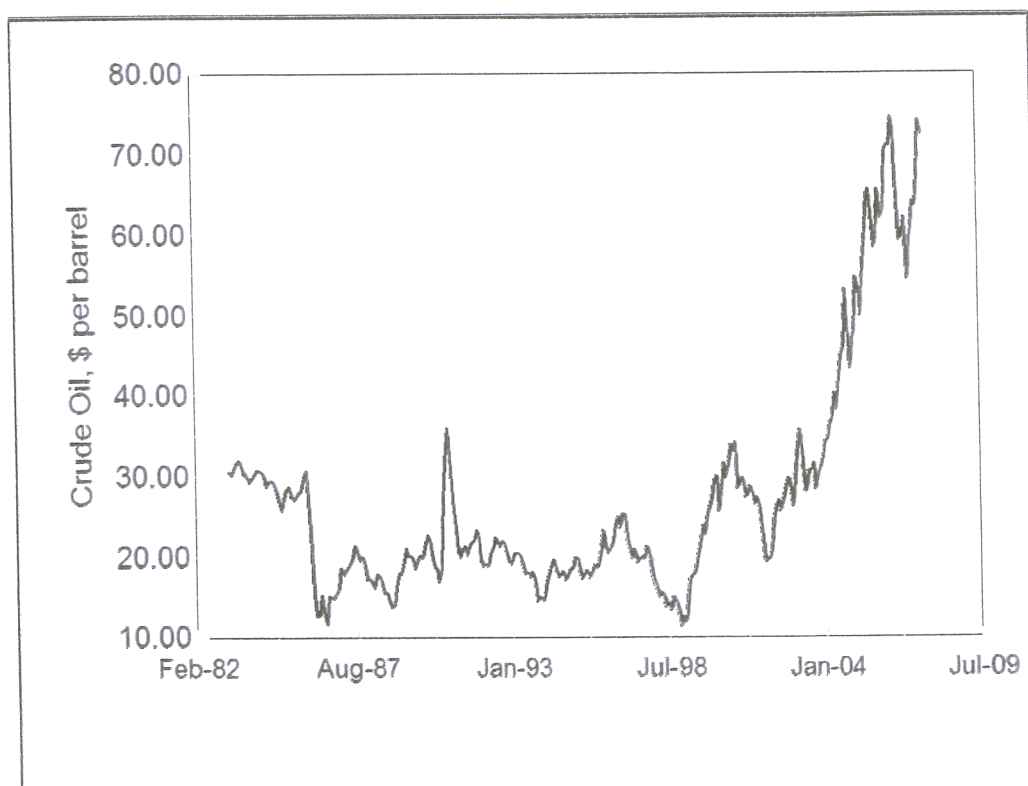


Figure 1 Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude
Source: Energy Information Administration

The price of crude oil was relatively flat during the 1990s, with prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to over \$70 per barrel in April 2006 and reached \$79.63 in September 2007. Forecasts expect crude oil prices to remain near current levels in the future.

In September 2007 the Energy Information Administration forecast the price of West Texas Intermediate Crude¹ would remain over \$71 per barrel through the end of 2008. During November 2007, prices were in the \$90 per barrel range.

At the same time, natural gas prices have increased from historically low values around \$2 per MCF in the late 1990s to a current price of about \$7 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline results in availability of transportation infrastructure having a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountains so wellhead natural gas prices in the area are depressed compared to the rest of the country.

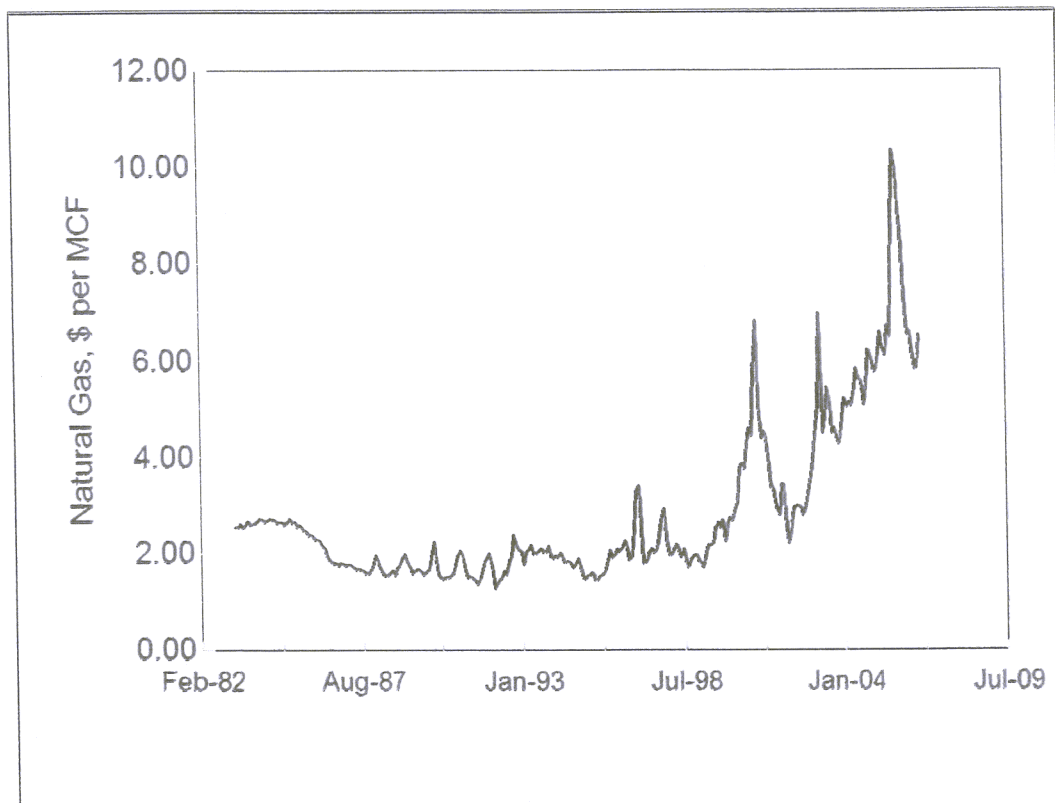


Figure 2 Average U.S. Wellhead Price of Natural Gas
Source: Energy Information Administration

¹West Texas Intermediate (WTI) refers to a crude stream produced in Texas and Oklahoma that is the most common reference or "marker" for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts for light, sweet crude oil.

While increased demand in the Pacific Rim has driven petroleum prices, demand has also increased in the U.S. In addition, domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain states are the only area in the country currently experiencing significant increases in production of crude oil and natural gas. Of the five Petroleum Administration for Defense Districts (PADD) (Figure 3) used for analyzing petroleum data, crude oil and natural gas production are increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).

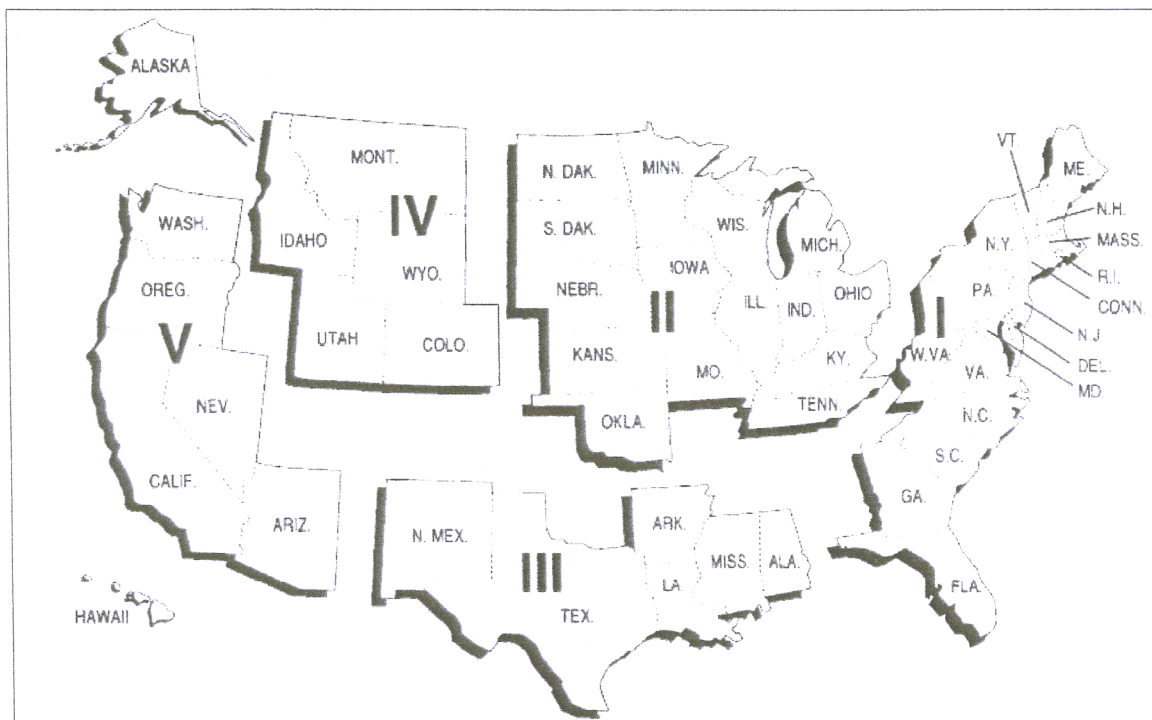


Figure 3 Petroleum Administration for Defense Districts (PADD)
Source: Energy Information Administration

Although crude oil production increased 11.3 percent and natural gas 15.3 percent on the East Coast from 2002 to 2005, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent while production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent. The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV supplied only 4.2 percent. By 2005, the

amount of natural gas produced in PADD III had dropped to 62.5 percent of total production while the amount from PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain states is creating an economic boom in the producing areas.

Table 1 U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
Percent Change, 2002-2005	11.3	(1.9)	(12.8)	20.4	(39.6)	(9.9)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
Percent Change, 2002-2005	15.3	(0.8)	(10.5)	16.4	(1.7)	(4.5)
Source: Energy Information Administration						

Despite the common perception of being vertically integrated, the oil and gas industry is highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few of the operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, perforating well casings and reservoir treatment and stimulation. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment, and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These economic benefits beyond direct employment in the exploration and production

industry are known as indirect and induced benefits, and are the source of the “multiplier” effect. This study examines the structure of the Utah oil and gas exploration and production industry and the total economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006’s output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

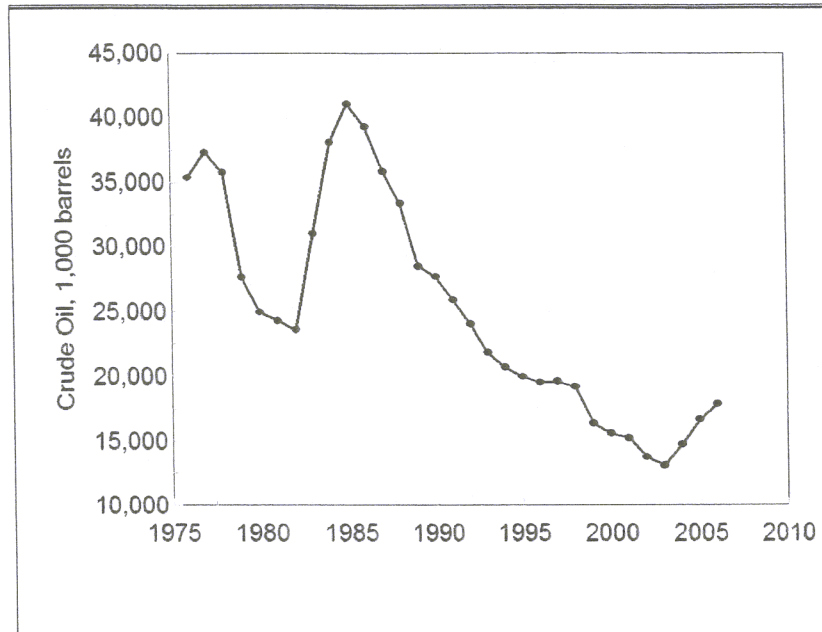


Figure 4 Utah Crude Oil Production
Source: Utah Division of Oil, Gas and Mining

There has been an even greater rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from 57 BCF in 1976 (Figure 5).

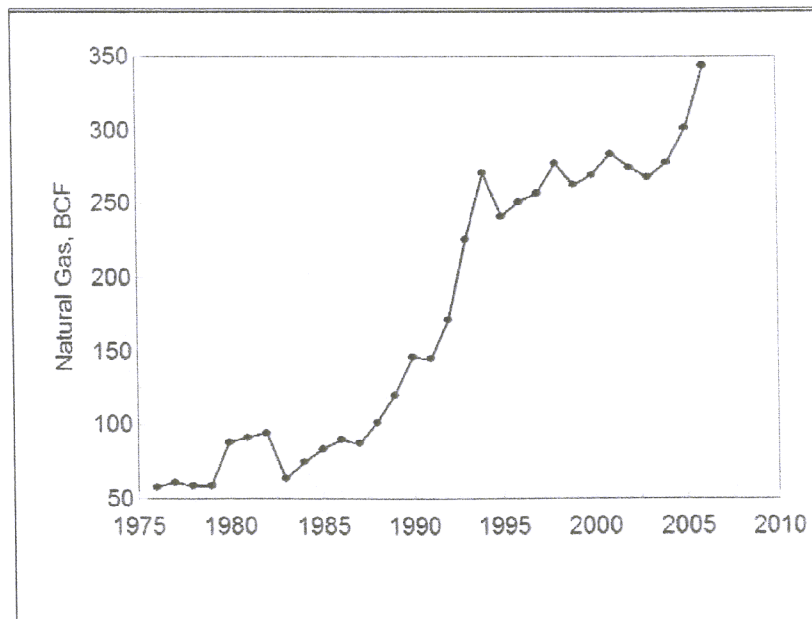


Figure 5 Utah Marketed Natural Gas Production
Source: Utah Geological Survey

Not all gross withdrawals of natural gas are marketed to consumers. Low prices of natural gas during the late 1980s and early 1990s resulted in much of the gas produced in Utah at the time not being marketable. A large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by nonhydrocarbon gases that are removed from the production stream prior to marketing.

Average production per well of both crude oil and natural gas has been declining in Utah, so additional drilling will have to continue to maintain production at current levels. Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well in Utah averaged 7,308 barrels during 2006.

During 2006, 129 different operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six different areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include both conventional plays and coalbed methane in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County and the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines to adjacent states. Many of the workers involved in operating wells in these areas are actually employed in other states. Expanded gas operations in Carbon and

Emery Counties and new oil production in the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the numerical North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The two-digit NAICS codes are divided into 20 major industrial sectors. These two-digit major sectors are then further subdivided as necessary with the addition of more numerical digits after the first two.

The NAICS codes have three industrial subdivision classifications that directly apply to the oil and gas E&P industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in Carbon and Emery Counties. Also included are economic data for Carbon and Emery Counties to place the oil and gas E&P industry in context.

3.1 Carbon and Emery Counties

For purposes of this report, the study area is defined as Carbon and Emery Counties, Utah. Coalbed methane production makes up a significant portion of the gas produced in the study area. Coalbed methane is reported as part of the natural gas production in Utah and when referring to production in the study area, the terms methane and natural gas are used synonymously in this report. Although there is potential for coalbed methane production from other coal deposits in Utah, and exploration has been conducted in other areas of the state, coalbed methane production has failed to materialize outside of Carbon and Emery.

The study area in central Utah has emerged as a significant coalbed methane producer over the past 15 years. Initial discoveries in the area were the conventional natural gas fields at Clear Creek in 1951 and at Ferron in 1957. Production noticeably increased in the early 1990s with discovery of the Drunkards Wash Field southwest of Price. Texaco Exploration and Production drilled two wells in 1988 and in 1991 River Gas Corporation took a 92,000-acre farmout from Texaco and commenced exploration. Between 1994 and 1997, exploratory drilling by Texaco established the Buzzard Bench Field between Huntington and Ferron. Meanwhile, Anadarko Petroleum Corp. established the Helper Field north of Price in 1993. Through a series of corporate buy-outs and mergers, ConocoPhillips has emerged as the major operator in the Drunkards Wash Field and is responsible for

almost half of total production in Carbon and Emery Counties. Coalbed methane development and production peaked in 2001-2002 and has declined since then. Recent discoveries of significant conventional gas deposits in deeper reservoirs by Bill Barrett Corporation in the Nine Mile and Peter's Point areas of northeastern Carbon County has brought renewed development activity to this area and started to reverse the overall gas production decline in 2006.

Carbon and Emery Counties contain just under 3.8 million acres (Table 2), with the federal government controlling nearly 72 percent of the land. The Bureau of Land Management is the major federal land-managing agency with responsibility for 2.5 million acres or 65 percent of the total. The U.S. Forest Service manages 6.3 percent of the land in the two counties. There is a small amount of National Park Service land where Capitol Reef National Park extends into the southwest corner of Emery County. With such a large portion of the land controlled by the federal government, the oil and gas E&P industry is highly sensitive to federal land management policy.

The majority of state land in the Carbon and Emery Counties is controlled by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA administers 11.6 percent of the land in the two counties with the Utah Division of Wildlife Resources and the Utah Division of State Parks and Recreation controlling lesser amounts of land. There is a minor amount of Indian land along the Green River at the eastern edge of the two counties. Only 16.2 percent of the land in the two counties is privately held.

Table 2 Land Ownership in Carbon and Emery Counties

	Carbon County, acres	Emery County, acres	Two-County Area Total, acres	Percent of Total
Bureau of Land Management	419,835	2,062,072	2,481,907	65.3
US Forest Service	30,237	210,652	240,889	6.3
National Park Service	0	2,085	2,085	0.1
Total Federal	450,162	2,274,808	2,724,970	71.7
State Parks	0	394	394	0.0
State Wildlife Lands	13,857	2,837	16,694	0.4
State Trust Lands	110,029	331,854	441,883	11.6
Total State Lands	123,887	335,085	458,972	12.1
Indian Lands	73	37	110	0.0
Private	373,511	240,425	613,936	16.2
Total	947,632	2,850,356	3,797,988	100.0
Source: Utah Governor's Office of Planning and Budget				

Production of both natural gas and crude oil in the study area has increased dramatically over the past 10 years, although there has been a decrease in natural

gas production in recent years. Although 2006 crude oil production in the two counties was nearly 10 times that of 1997, the area remains a minor producer of crude oil in Utah (Table 3). The 2006 production of 31,942 barrels of crude oil was 0.2 percent of statewide production.

Table 3 Carbon and Emery Counties Crude Oil Production, 1997-2006

	Crude Oil, barrels			
	Carbon County	Emery County	Two-County Area Total	State Total
1997	0	3,354	3,354	19,592,548
1998	0	3,662	3,662	19,223,542
1999	527	1,649	2,176	16,376,521
2000	211	3,279	3,490	15,609,030
2001	128	4,552	4,680	15,273,926
2002	46	2,493	2,539	13,770,860
2003	1,885	6,191	8,076	13,098,424
2004	4,661	4,657	9,318	14,799,208
2005	9,468	3,196	12,664	16,675,302
2006	27,906	4,036	31,942	17,926,580
Percent of State Total, 2006	0.2	0.0	0.2	100.00
Source: Utah Division of Oil, Gas and Mining				

The study area is primarily a producer of natural gas, while oil production is minor, generally as an associated byproduct of gas production. Over the past 10 years, natural gas production in the area increased from 23.7 BCF in 1997 to 104.6 BCF in 2002 before declining to 98.5 BCF in 2006 (Table 4). Even with the decline from 2002, production in 2006 was over four times the level in 1997. During 2006, the two counties were responsible for 27.7 percent of natural gas production in Utah. Although Carbon County produces the bulk of the natural gas from the two counties, production in Emery County has been growing faster. From 1997 to 2006, natural gas production in Emery County increased by over 1,600 percent, while production in Carbon County increased by only 262 percent.

Table 4 Carbon and Emery Counties Natural Gas Production (Gross Withdrawals), 1997-2006

	Natural Gas, MCF			
	Carbon County	Emery County	Two-County Area Total	State Total
1997	22,760,216	926,911	23,687,127	272,553,774
1998	31,903,361	1,345,422	33,248,783	297,503,246
1999	50,175,216	2,317,596	52,492,812	277,494,312
2000	72,586,085	4,042,810	76,628,895	281,170,016
2001	86,532,946	7,718,744	94,251,690	300,975,578
2002	90,700,883	13,901,494	104,602,377	293,030,004
2003	85,179,739	17,213,152	102,392,891	287,141,238
2004	79,238,531	17,443,464	96,681,995	293,735,994
2005	74,822,590	16,606,967	91,429,557	313,465,305
2006	82,337,741	16,199,707	98,537,448	356,361,028
Percent of State Total, 2006	23.1	4.5	27.7	100.0
Source: Utah Division of Oil, Gas and Mining				

Drilling activity in the two counties reflects the rise in natural gas production that occurred in the late 1990s (Table 5). Drilling peaked with 148 wells spudded in 2001. At the time, the two counties accounted for 23.6 percent of all wells spudded in the state. Drilling declined to only 36 wells spudded in 2004, but rising gas prices stimulated additional drilling activity and the number of wells spudded hit 78 in 2006. The number of wells drilled in the area can be expected to continue to rise in the future. In September 2005, Bill Barrett Corporation announced plans and began work on an environmental impact statement to drill 750 new gas wells in the West Tavaputs area of northeast Carbon County.

Table 5 Wells Spudded in Carbon and Emery Counties, 1997-2006

	Wells Spudded			
	Carbon County	Emery County	Two-County Area Total	State Total
1997	41	23	64	430
1998	74	3	77	430
1999	110	16	126	283
2000	122	55	144	540
2001	104	44	148	627
2002	51	53	104	391
2003	34	14	45	480
2004	32	4	36	659
2005	59	27	86	889
2006	57	21	78	1,057
Percent of State Total, 2006	5.4	2.0	7.4	100.00
Source: Utah Division of Oil, Gas and Mining				

3.1.1 Carbon and Emery Counties Economy

While production of both crude oil and natural gas is increasing in the Carbon and Emery Counties, this increase must be placed in the context of the complete economy for the two counties.

The two counties had an estimated 2006 population of 29,942, down 1.5 percent from 2002 (Table 6). Major cities include Price, with an estimated 2006 population of 8,010, Huntington (2,061), Helper (1,886), Castle Dale (1,617), Wellington (1,570) and Ferron (1,569). The 2000 Decennial Census determined that 40.5 percent of the population lives in the urban area of Price. The remainder of the two counties are not densely enough populated to be considered urban.² Although it contained over 40 percent of the population of the two counties, Price accounts for only 0.15 percent of the area in the two counties.

²The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a population density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet criteria established by the Bureau of the Census.

Table 6 Carbon and Emery Counties Population, 2002-2006

	Population			
	Carbon County	Emery County	Two-County Area Total	State Total
2002	19,858	10,540	30,398	2,358,330
2003	19,558	10,477	30,035	2,413,618
2004	19,385	10,493	29,878	2,469,230
2005	19,338	10,491	29,829	2,547,389
2006	19,504	10,438	29,942	2,615,129
Source: Utah Population Estimates Committee				

The study area is benefitting economically from the boom in energy prices, with the unemployment rate dropping from 8.3 percent in January 2004 to 3.8 percent in September 2007 (Figure 6). Since energy prices have been increasing, employment in the study area has steadily risen, from 13,000 persons in January 2003 to 15,299 persons in September 2007. Although the unemployment rate in the area has been dropping, it has consistently been above the state average since the beginning of 1997.

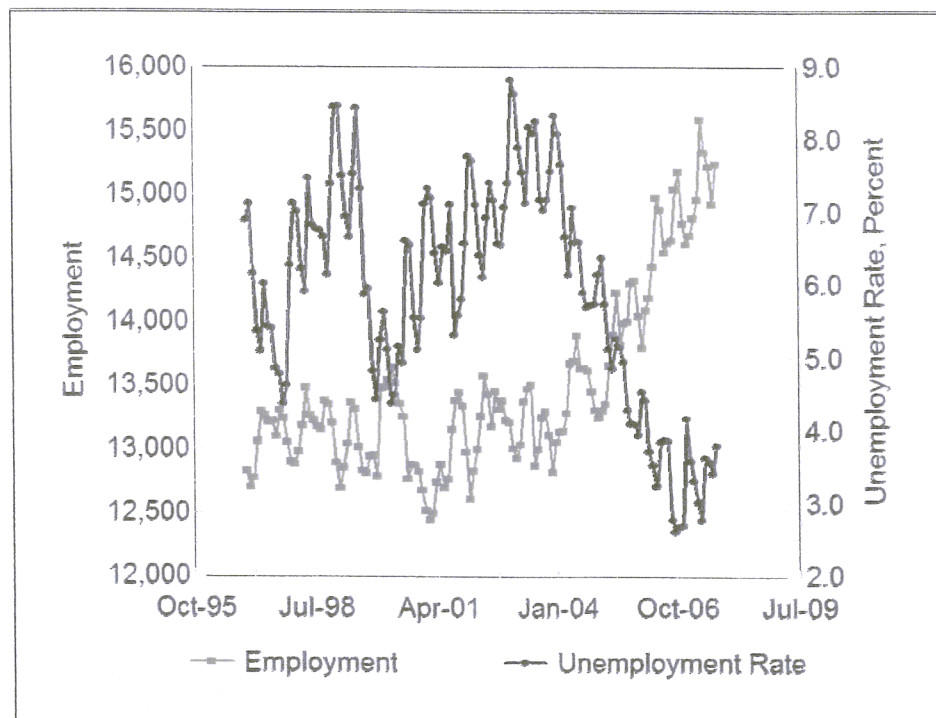


Figure 6 Employment and the Unemployment Rate in Carbon and Emery Counties
Source: BLS, Local Area Unemployment Statistics

The industrial structure of the two counties has significant differences from that of the state of Utah (Table 7). Mining (NAICS 21) constitutes a significant portion of the economy with both coal mining and oil and gas production figuring prominently. There is also one gypsum operation in Emery County and several sand and gravel operations. Approximately 90 percent of the Mining (NAICS 21) employment in the two counties is due to coal mining, not oil and gas production. Although coal mining employment is not disclosable by federal data agencies because of the small number of firms, the Utah Geological Survey determined that coal mining employment was 1,657 jobs in the two counties during 2006.

Utilities (NAICS 22) are also a major portion of the area's economy due to the presence of three coal-fired power plants with a total summer generating capacity of 2,387 MW. The Hunter Plant (1,320 MW) is located south of Castle Dale and the Huntington Plant (895 MW) is sited at the mouth of Huntington Canyon near Huntington; both are located in Emery County. The Carbon Plant (172 MW) is in Price Canyon north of Price in Carbon County. Although Utility industry (NAICS 22) employment is not disclosable for Emery County due to the concentration of employment in one company, the presence of the three power plants results in the electric utility industry being an important component of the area's economy.

Several other major industries have employment data that are not disclosable for Carbon or Emery Counties. This is done to protect individual company data. In Carbon County, besides Mining, employment data are nondisclosable for Agriculture, Forestry, Fishing and Hunting (NAICS 11); Educational Services (NAICS 61); and Health Care (NAICS 62). Emery County has a smaller economy than Carbon County and has eight industries with nondisclosable data. These are the same industries that were nondisclosable in Carbon plus Utilities (NAICS 22), Wholesale Trade (NAICS 42), Management of Companies and Enterprises (NAICS 55), and Administrative and Support (NAICS 56). Since employment numbers are not reported for these industries, location quotients³ can not be calculated.

Industries for which employment was reported and which have low location quotients in the study area include Manufacturing (NAICS 31-32); Real Estate (NAICS 53); Professional, Scientific and Technical Services (NAICS 54); and Arts, Entertainment and Recreation (NAICS 71). Manufacturing has a location quotient of 0.32, indicating that the area is only 32 percent as dependent on Manufacturing for employment as is the state of Utah.

³Location Quotients are the ratio of an industry's share of employment in a study area, in this case Carbon and Emery Counties, to its share in a reference area, e.g., the state of Utah.

Table 7 Employment by Industry in Carbon and Emery Counties, 2006

	Carbon County	Emery County	Two-County Area	Distribution, Percent	Location Quotient
Private Employment					
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	ND	ND	NA	NA
Mining (NAICS 21)	ND	ND	ND	NA	NA
Utilities (NAICS 22)	138	ND	ND	NA	NA
Construction (NAICS 23)	393	338	731	5.6	0.69
Manufacturing (NAICS 31-32)	418	17	435	3.4	0.32
Wholesale Trade (NAICS 42)	450	ND	ND	NA	NA
Retail Trade (NAICS 44-45)	1,286	433	1,719	13.3	1.10
Transportation and Warehousing (NAICS 48-49)	300	135	435	3.4	0.92
Information (NAICS 51)	127	132	259	2.0	0.75
Finance and Insurance (NAICS 52)	192	52	244	1.9	0.41
Real Estate (NAICS 53)	59	6	65	0.5	0.33
Professional, Scientific and Technical Services (NAICS 54)	220	59	279	2.2	0.41
Management of Companies and Enterprises (NAICS 55)	58	ND	ND	NA	NA
Administrative and Support (NAICS 56)	371	ND	ND	NA	NA
Educational Services (NAICS 61)	ND	ND	ND	NA	NA
Health Care (NAICS 62)	ND	ND	ND	NA	NA
Arts, Entertainment and Recreation (NAICS 71)	71	0	71	0.5	0.37
Accommodation and Food Services (NAICS 72)	742	169	911	7.0	0.90
Other Services (NAICS 81)	342	143	485	3.7	1.50
Government Employment	1,978	823	2,801	21.6	1.32
Total Employment	9,067	3,887	12,954	100.0	1.00
ND: Not disclosed to protect individual company information. NA: Not Applicable. Source: BLS, Quarterly Census of Employment and Wages					

Both the concentration of the coalbed methane industry and its recent development in Carbon and Emery Counties are reflected in the employment data released by the Bureau of Labor Statistics (Table 8). If an industry is dominated by one company in an area, data are not released to prevent disclosure of individual company data. Much of the employment data specific to the oil and gas industry is not disclosable in Carbon and Emery Counties. Two characteristics of the industry in the two counties contribute to this. First, few operating companies maintain offices in the area. Only three operating companies (NAICS 211) reported employment in the area during 2006. The three companies were all located in Carbon County. The Drunkards Wash Field in Carbon County, currently operated by ConocoPhillips, is sufficiently large compared to other fields in the area that employment is concentrated in one company. Second, since the coalbed methane industry is a relatively recent development in the area, with major production occurring over the past 15 years, a sizable oil and gas service industry has not developed in the two counties, resulting in employment for drilling and service companies not being disclosable.

Table 8 Oil and Gas E&P Employment in Carbon and Emery Counties, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Carbon County			
2001	ND	0	19
2002	ND	0	ND
2003	ND	ND	44
2004	ND	ND	32
2005	ND	ND	ND
2006	ND	ND	ND
Emery County			
2001	0	0	ND
2002	0	0	ND
2003	0	0	ND
2004	ND	0	ND
2005	0	0	ND
2006	0	0	ND
ND: Not disclosed to protect individual company data. Source: BLS, Quarterly Census of Employment and Wages			

In the absence of data from the government statistical agencies, operating companies with offices in the area were contacted to obtain employment information. Currently, three operating companies maintain offices in the two

counties and directly employ 72 persons. Data obtained from these companies indicate that the average annual wage paid by companies in the Oil and Gas Extraction industry (NAICS 211) in the area is approximately \$52,000 annually. Data from the Bureau of Labor Statistics indicates that the average annual wage in Carbon County for the Support Activities for Mining industry (NAICS 213) was \$43,100 during 2006. Both the well drilling companies (NAICS 213111) and service companies (NAICS 213112) are subsets of the Support Activities for Mining (NAICS 213) industry and should pay similar wages.

Of the major industries in the two counties, only coal mining, Construction and Utilities pay a higher average wage (Table 9). The average wage for coal mining for the two counties is not disclosed by the government statistical agencies, but the statewide average annual wage for coal mining was \$62,666 in 2006. Since 82 percent of the coal mining employment in Utah is located in Carbon and Emery Counties, the wage in these counties should be close to the statewide average. The average annual wage for Utilities in Carbon County was \$81,156 in 2006. Since the majority of employment in the Utilities industry in both counties are power plant operators, the average annual wage for the industry in Emery County should be similar. The average wage for Construction was \$56,139 in Carbon County and \$38,988 in Emery County during 2006.

Table 9 Average Annual Wage by Industry in Carbon and Emery Counties, 2006

	Carbon County	Emery County
Private Employment		
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	ND
Mining (NAICS 21)	ND	ND
Utilities (NAICS 22)	\$81,156	ND
Construction (NAICS 23)	56,139	\$38,988
Manufacturing (NAICS 31-32)	44,177	31,440
Wholesale Trade (NAICS 42)	44,491	ND
Retail Trade (NAICS 44-45)	19,084	13,226
Transportation and Warehousing (NAICS 48-49)	35,915	33,142
Information (NAICS 51)	20,694	30,837
Finance and Insurance (NAICS 52)	28,541	21,634
Real Estate (NAICS 53)	17,345	3,521
Professional, Scientific and Technical Services (NAICS 54)	16,938	29,393
Management of Companies and Enterprises (NAICS 55)	45,990	ND
Administrative and Support (NAICS 56)	20,550	ND
Educational Services (NAICS 61)	ND	ND
Health Care (NAICS 62)	ND	ND
Arts, Entertainment and Recreation (NAICS 71)	11,612	0
Accommodation and Food Services (NAICS 72)	9,066	10,551
Other Services (NAICS 81)	22,390	36,379
Government Employment	30,401	26,789
All Employment	32,603	39,864
ND: Not disclosed to protect individual company information.		
Source: BLS, Quarterly Census of Employment and Wages		

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Carbon and Emery Counties

The study area of Carbon and Emery Counties is an important component of the oil and gas E&P industry in Utah. In turn the industry is becoming more important to the local economy as additional wells are drilled, resulting in rising employment and

wages. Since the industry is a relatively recent development in the area, many of the service companies have not established a permanent presence there but work out of offices in the Uinta Basin. Employment in the two counties in the oil and gas E&P industry is estimated at 137 persons, or 1.1 percent of total employment during 2006 (Table 10). Due to the industry paying higher than average wages, total wages in the area are estimated at \$6.5 million, or 1.5 percent of total wages for 2006.

Table 10 Direct Employment and Wages in the E&P Industry in Carbon and Emery Counties, 2006

	Carbon and Emery Counties Total	
	Employment	Wages, \$1,000
Total	12,954	450,623
E&P Industry, Direct	137	6,546
E&P Industry, percent of total	1.1	1.5
Source: BLS, Quarterly Census of Employment and Wages; Utah Department of Workforce Services FirmFind; interviews with companies; author's estimates.		

In addition to the direct employment, additional jobs and wages due to spending by the industry and employees results in significant economic benefits to the study area. Other employment due to spending by the E&P industry is not limited to the mining industry but is distributed throughout different industries. Total employment in the two-county area due to the E&P industry, including direct, indirect, and induced, was estimated at 4.0 percent of total jobs in the area in 2006 (Table 11). When examining employment by industry, the oil and gas industry is shown to have significant effects on several other industries.

The E&P industry is responsible for 14.1 percent of total employment in the Construction industry in Carbon and Emery Counties. Additionally, 7.1 percent of the Real Estate employment in the area is due to oil and gas operations. There are an estimated 10 additional mining jobs in the area due to the oil and gas operations; these jobs are in addition to the estimated 137 jobs directly in the E&P industry. When considering both the direct jobs and the additional indirect and induced jobs in the mining industry, the oil and gas E&P industry is responsible for 8.1 percent of total mining jobs in the two counties, based on Utah Geological Survey estimates of coal mining employment in the area. The coal mining industry, which is much more labor intensive, is responsible for the bulk of the remaining mining jobs.

Although there are government employees located in the Coalbed Methane Area to regulate the oil and gas industry, these are not considered part of the Mining industry. The state Division of Oil, Gas and Mining has an office in Price and there are also local BLM and USFS employees dedicated to regulating the industry. For purposes of employment classification, these employees are considered to be

employed in NAICS 92 – Public Administration, which is included in the government employment in Table 11.

Table 11 Employment Due to Oil and Gas E&P in Carbon and Emery Counties, 2006

	Two-County Area Total Employment	Total Employment Due to Oil and Gas E&P	Oil and Gas E&P Employment, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	1	NA
Mining (NAICS 21)	1,804	147	8.1
Utilities (NAICS 22)	ND	44	NA
Construction (NAICS 23)	731	103	14.1
Manufacturing (NAICS 31-32)	435	5	1.2
Wholesale Trade (NAICS 42)	ND	10	2.1
Retail Trade (NAICS 44-45)	1,719	68	4.0
Transportation and Warehousing (NAICS 48-49)	435	16	3.7
Information (NAICS 51)	259	4	1.4
Finance and Insurance (NAICS 52)	244	6	2.3
Real Estate (NAICS 53)	65	5	7.1
Professional, Scientific and Technical Services (NAICS 54)	279	4	1.5
Management of Companies and Enterprises (NAICS 55)	ND	1	NA
Administrative and Support (NAICS 56)	ND	10	NA
Educational Services (NAICS 61)	ND	11	NA
Health Care (NAICS 62)	ND	25	NA
Arts, Entertainment and Recreation (NAICS 71)	71	3	3.6
Accommodation and Food Services (NAICS 72)	911	34	3.7
Other Services (NAICS 81)	485	27	5.5
Households	NA	2	NA
Government Employment	2,801	NA	NA
All Employment	12,954	524	4.0
ND: Nondisclosable. Data are included in the totals. NA: Not applicable.			
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.			

Oil and gas E&P accounts for just under five percent of all wages paid in the two counties (Table 12). The industry is responsible for a higher percentage of wages than employment due to oil and gas E&P paying above average wages. The oil and gas industry is responsible for 6.6 percent of an estimated \$111 million in wages in the Mining (NAICS 21) industry in the two counties. Both the Construction (NAICS 23) and Real Estate (NAICS 53) industries have more than 10 percent of their total wages due to spending by the oil and gas industry.

Table 12 Wages Due to Oil and Gas E&P in Carbon and Emery Counties, 2006

	Two-County Area Total Wages, \$1,000	Total Wages Due to Oil and Gas E&P, \$1,000	Oil and Gas E&P Wages, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	9	NA
Mining (NAICS 21)	111,000	7,359	6.6
Utilities (NAICS 22)	ND	3,891	NA
Construction (NAICS 23)	35,249	4,241	12.0
Manufacturing (NAICS 31-32)	18,992	260	1.4
Wholesale Trade (NAICS 42)	ND	458	2.3
Retail Trade (NAICS 44-45)	30,198	1,542	5.1
Transportation and Warehousing (NAICS 48-49)	15,243	945	6.2
Information (NAICS 51)	6,713	191	2.8
Finance and Insurance (NAICS 52)	6,599	218	3.3
Real Estate (NAICS 53)	1,044	117	11.2
Professional, Scientific and Technical Services (NAICS 54)	5,450	207	3.8
Management of Companies and Enterprises (NAICS 55)	ND	56	NA
Administrative and Support (NAICS 56)	ND	214	NA
Educational Services (NAICS 61)	ND	233	NA
Health Care (NAICS 62)	ND	924	NA
Arts, Entertainment and Recreation (NAICS 71)	825	44	5.4
Accommodation and Food Services (NAICS 72)	9,660	530	5.5
Other Services (NAICS 81)	12,846	678	5.3
Households	NA	36	NA
Government Employment	82,266	NA	NA
All Employment	450,623	22,151	4.9
ND: Not disclosed. NA: Not applicable.			
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.			

5 Fiscal Impacts

The oil and gas industry also has fiscal impacts on the local areas. Fiscal impacts refer to impacts on government finances and tax collections. The oil and gas industry is subject to the tax laws common to all businesses. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The

Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise (Table 13). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 13 includes royalties due to oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 13 Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522
Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.						
Source: Minerals Management Service						

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 14). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 14 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands

controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 14 Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index.	
Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas Severance Tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 15). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to Carbon and Emery Counties.

Table 15 State Tax Collections Related to Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449
Note: Years are state fiscal years.		
Source: Utah State Tax Commission		

5.1 Carbon and Emery Counties

The largest direct fiscal impacts on Carbon and Emery Counties due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Property taxes paid on oil and gas properties have become a significant portion of total property taxes in the two counties (Table 16). During 2006, the oil and gas industry paid nearly 25 percent of total property taxes in the two counties. Over one-third of the property tax paid in Carbon County during 2006 was due to oil and gas production and just over one-tenth of the property tax in Emery County was due to oil and gas. The two large power plants located in Emery County mean that 65 percent of property taxes in Emery County are paid by the utilities industry. Table 16 refers to all property taxes paid to various government entities in the two counties, not just the county governments. As the price of natural gas has increased in recent years, the net present value of future production has increased. This, coupled with rising production, has resulted in the amount of property taxes paid by the oil and gas industry in the two counties increasing by over 25 times over the past 10 years, not adjusting for inflation. Oil and gas property taxes have been rising faster in Emery County than in Carbon County, reflecting rising natural gas production in the county. Property taxes paid on oil and gas production increased by 4,622 percent in Emery County from 1997 to 2006, and by 2,155 percent in Carbon County. Given the rising production and expected continuation of current energy prices, the property taxes paid by the oil and gas production industry in the two counties should continue to rise into the future.

Table 16 Oil and Gas Property Tax Payments in Carbon and Emery Counties, 1997-2006

	Carbon County		Emery County		Two-County Area Total	
	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax
1997	\$359,255	3.0	\$44,722	0.2	\$403,977	1.2
1998	653,781	4.9	56,297	0.3	710,078	2.2
1999	1,233,733	10.2	144,661	0.7	1,378,394	4.4
2000	3,316,312	22.2	237,473	1.2	3,553,785	10.4
2001	4,779,864	28.0	547,486	2.8	5,327,350	14.4
2002	4,290,845	26.5	755,816	4.1	5,046,661	14.6
2003	4,567,518	24.5	985,587	5.5	5,553,105	15.1
2004	6,576,519	32.8	1,496,054	8.2	8,072,573	21.1
2005	7,418,552	38.7	1,836,886	10.2	9,255,438	24.9
2006	8,101,170	35.8	2,111,766	10.9	10,212,936	24.3

Source: Utah State Tax Commission, Property Tax Division Annual Reports

In terms of property taxes paid, the oil and gas industry has a greater fiscal impact on Carbon and Emery Counties than does the coal mining industry. In 2006, property taxes charged against coal mines in the two counties totaled \$3,483,001, or 34.1 percent of the amount charged against oil and gas wells.

The funds generated through federal mineral royalties that are returned to the two counties through the Utah Department of Transportation are also a significant source of revenue for the local governments. These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2006, Carbon and Emery Counties collectively received \$13.7 million dollars in federal mineral royalties returned to them by the Department of Transportation (Table 17). This was a 70 percent increase over the amount returned in 2001.

Table 17 Federal Mineral Royalties Returned by UDOT to Carbon and Emery Counties, 2001-2006

	Carbon County	Emery County	Two-County Area Total
2001	\$5,140,732	\$2,900,800	\$8,041,532
2002	2,260,889	1,703,743	3,964,632
2003	3,233,674	2,208,352	5,442,026
2004	5,421,384	3,761,439	9,182,823
2005	7,050,220	4,082,628	11,132,848
2006	10,145,446	3,566,833	13,712,279

Note: Years are state fiscal years.
Source: Utah Department of Transportation

Table 17 includes data on all royalties from federal mineral leases in Utah, not just oil and gas operations. There is significant coal production from federal leases in the two counties and a major portion of the federal mineral royalties returned by UDOT may be due to coal production. Almost all federal mineral royalties in the two counties are the result of energy production, whether coal, oil or natural gas. The rise in energy prices in recent years, coupled with the resultant production increases, has had a noticeable fiscal impact on the two counties.

Royalties paid to SITLA due to production of oil and gas in Carbon and Emery Counties dropped slightly from 2005 to 2006 (Table 18).

Table 18 Royalties Paid for Production on SITLA Lands in Carbon and Emery Counties, 2005-2006

	Carbon County	Emery County	Two-County Area Total
2005	\$21,077,378	\$5,775,864	\$26,853,242
2006	19,786,589	5,355,106	25,141,695
Note: Years are state fiscal years.			
Source: School and Institutional Trust Lands Administration			

Most of the Drunkards Wash Field is on land controlled by SITLA and SITLA receives royalties for oil and gas production. Previous, the Drunkards Wash area was administered by the BLM but was acquired by SITLA in 1998 as part of a land exchange agreement with the federal government. Since there were preexisting federal leases in the area, the agreement stated the two county governments would not lose federal mineral royalties as a result of the land exchange. Originally, SITLA remitted one-half of the royalties received from the Drunkards Wash Field (after deducting a 3 percent administrative fee) to the state Mineral Lease Account. This account also receives federal mineral royalties returned to the state by the federal government and the funds deposited by SITLA were mingled with federal mineral royalties and distributed according to state law (Table 14). The other half of the royalties from the Drunkards Wash Field are retained by SITLA for disbursement to the various beneficiaries.

As of March 15, 2007, Utah state law changed and royalties from the Drunkards Wash Field previously deposited in the state Mineral Lease Account are now returned by the state Division of Finance to the county of origin. Between March 15, 2007 and the end of September 2007, \$2.3 million had accrued with the state Division of Finance and were awaiting distribution to the two county governments.

Fiscal effects also arise from the direct, indirect and induced impacts of the oil and gas E&P industry. State personal income taxes as a result of oil and gas E&P activities in the two counties are estimated at \$681,000 for 2006 (Table 19).

Table 19 Personal State Income Taxes Due to Oil and Gas E&P in Carbon and Emery Counties

	Two-County Area Total
Total Wages due to Oil and Gas E&P, \$1,000	22,151
Personal State Income Taxes, \$1,000	681
Source: Author's Calculations. Details of the estimation are in Section 6.	

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, with the services sector becoming a much larger portion of the economy and more complex than when the SIC codes were developed. In the switch, the 10 major industrial sectors under the SIC codes were replaced with 20 major sectors under the NAICS codes. Many of the industrial sectors under the SIC codes were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. To demonstrate the level of detail obtained, Table 20 presents the divisions of the Mining (NAICS 21) sector. The Mining sector is divided into a total of 28 different industries. The other 19 industrial sectors are similarly subdivided.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

Table 20 NAICS Codes Related to the Mining Industry

NAICS Code	Industry
21	Mining, Quarrying, and Oil and Gas Extraction
211	Oil and Gas Extraction
2111	Oil and Gas Extraction
21111	Oil and Gas Extraction
211111	Crude Petroleum and Natural Gas Extraction
211112	Natural Gas Liquid Extraction
212	Mining (except Oil and Gas)
2121	Coal Mining
21211	Coal Mining
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
2122	Metal Ore Mining
21221	Iron Ore Mining
212210	Iron Ore Mining
21222	Gold and Silver Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
21223	Copper, Nickel, Lead and Zinc Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
21229	Other Metal Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
21231	Stone Mining and Quarrying
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
21232	Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand and Gravel Mining
212324	Kaoline and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
21239	Other Nonmetallic Mineral Mining and Quarrying
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213	Support Activities for Mining
2131	Support Activities for Mining
21311	Support Activities for Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining

6.1 NAICS Codes Related to Oil and Gas Production

There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211 – Oil and Gas Extraction Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111 – Drilling Oil and Gas Wells This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling.

NAICS 213112 – Support Activities for Oil and Gas Operations This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include products that are exported and new construction funding. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside a regional economy, known as residentiary spending, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah. Many similar studies present the total economic output of an activity as the economic impact; this is the sum of all transactions in a supply chain and can be much larger than the value of the final good or service provided to the end consumer. Similarly, many authors apply economic output multipliers to all spending related to an activity, with no distinction between export-based and residentiary spending. The result is often termed “economic contribution” and presented as economic impact. As with all economic output calculations, the result is much larger than the value of the final product delivered to an end consumer.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid. In addition, there are additional indirect and induced impacts. Indirect impacts result from local spending by the E&P industry and induced impacts arise from employees of the E&P industry spending their earnings.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in Carbon and Emery Counties. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a

national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

Data on spending by the E&P industry in the two counties was obtained via a survey of operating, drilling and service companies operating in the area. Personnel with the Bureau of Economic and Business Research at the University of Utah worked with the Independent Petroleum Association of the Mountain States (IPAMS) to develop survey forms with input from several representatives of the petroleum industry. IPAMS distributed the survey forms to operating, drilling and service companies operating in Carbon and Emery Counties and the forms were returned to the Bureau of Economic and Business Research. Data from returned survey forms was totaled by spending category. Using data on total production of oil and gas, number of wells spudded and employment reported by government agencies, the total spending reported by responding companies was expanded to total industry spending in the region. The multipliers from the RIMS II model were then applied to the total spending by category to determine the indirect and induced employment and wages. Trade margins were applied to the Retail Trade, Wholesale Trade, and Transportation industries.

State income tax impacts were estimated by calculating the ratio of the Utah income tax liability for Carbon and Emery Counties to the sum of the total earnings by place of work for the two counties as determined by the Bureau of Economic Analysis. The average of this ratio for the years 2003 through 2005 was 4.02 percent. This ratio was then applied to the total estimated earnings due to oil and gas E&P in Carbon and Emery Counties of \$22.2 million to estimate the state personal income tax.

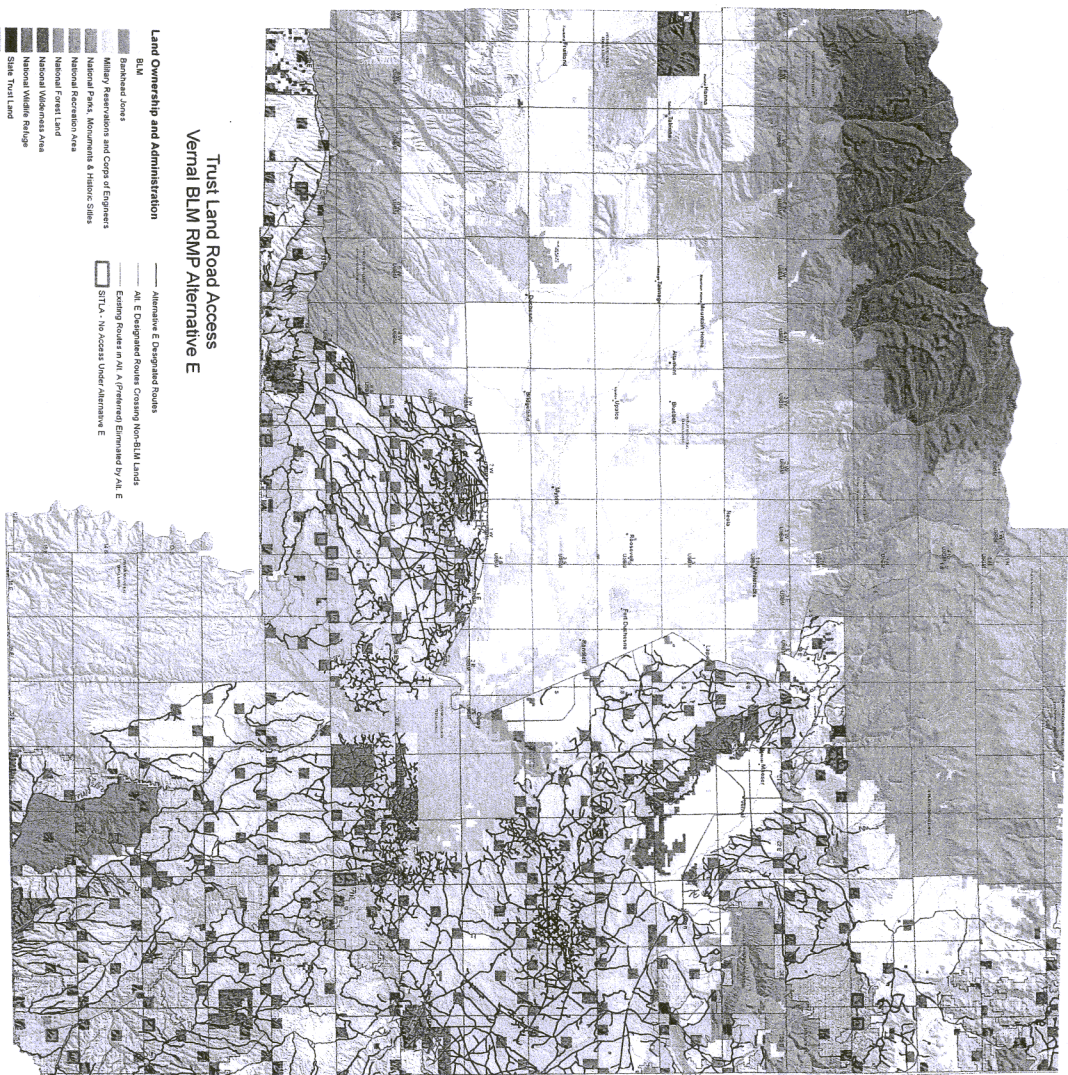
7 References

- Bureau of Economic Analysis. 2007.** Local Area Personal Income. <http://www.bea.gov/regional/reis/>. Downloaded Nov. 6, 2007.
- Bureau of Labor Statistics. 2007.** Quarterly Census of Employment and Wages. <http://stats.bls.gov/cew/home.htm>. Downloaded Sept. 9, 2007.

- Energy Information Administration. 2007.** *Short-Term Energy Outlook September 2007.* <http://www.eia.doe.gov/emeu/steo/pub/contents.html>. Downloaded Sept. 11, 2007.
- Isard, W., I.J. Azis, M. P., Drennan, R. E. Miller, S. Saltzman, and E. Throbecke. 1998.** *Methods of Interregional and Regional Analysis.* Ashgate Publishing Limited. 490 pp.
- Minerals Management Service. 2007.** MRM Statistical Information. <http://www.mrm.mms.gov/MRMWebStats/default.aspx>. Downloaded Oct. 3, 2007.
- Montgomery, S. L., D. E. Tabet., and C. E. Barker. 2001.** Upper Cretaceous Ferron Sandstone: Major Coalbed Methane Play in Central Utah. *AAPG Bulletin.* vol. 85, no. 2, February 2001. pp. 199-219.
- Office of Management and Budget. 2007.** *North American Industry Classification System.* 1390 pp.
- Schaffer, W. A. 1999.** *Regional Impact Models.* West Virginia University Regional Research Institute. <http://www.rrri.wvu.edu/WebBook/Schaffer/index.html>. Accessed July 18, 2007. 80 pp.
- Tabet, D. E., and J. C. Quick. 2003.** Frontier Area for Coalbed-Gas Exploration in Utah. *Survey Notes.* Utah Geological Survey. vol. 34, no. 2. April 2003. pp. 10-11.
- U.S. Bureau of the Census. 2007.** Subcounty Population Data Sets. <http://www.census.gov/popest/cities/SUB-EST2006-states.html>. Downloaded Sept. 12, 2007.
- Utah Department of Transportation. 2007.** Mineral Lease Distributions. <http://www.dot.utah.gov/main/f?p=100:pg:11808295696151236794:::1:T,V:135,>. Downloaded Oct. 4, 2007.
- Utah Division of Oil, Gas and Mining. 2007.** Production Reports. <http://oilgas.ogm.utah.gov/Publications/Publications.htm>. Downloaded Sept. 12, 2007.
- Utah Geological Survey. 2006.** *Utah! 100 Years of Exploration and Still the Place to Find Oil and Gas.* Public Information Series 71. nonpaginated.
- Utah Governor's Office of Planning and Budget. 2000.** *Federal Land Payments in Utah.* <http://governor.utah.gov/dea/Publications/Report.pdf>. Downloaded Sept. 11, 2007.

Utah State Tax Commission. 2007. Revenue Reports (TC-23).
<http://www.tax.utah.gov/esu/revenue/index.html>. Downloaded Nov. 5, 2007.

Utah State Tax Commission. 2007. Utah Income and Corporate Tax Statistics.
<http://www.tax.utah.gov/esu/income/index.html>. Downloaded Nov. 2, 2007.



Trust Land Road Access Vernal BLM RMP Alternative E

- Land Ownership and Administration**
- BLM
 - Bureau of Reclamation
 - National Forest Land
 - National Wildlife Refuge
 - State Trust Land
 - State Sovereign Land
 - State Parks and Recreation
 - State Wildlife Management Area
 - Other State Land
 - Private
 - Tribal Land
 - Water or Wetland
 - Intermittent Water
 - Existing BLM Wilderness Study Areas (2/99)
 - BLM Wilderness Potential Areas (1/93)
 - Carter's Wilderness Proposal (March, 2003)

- Alternative E Designated Routes**
- Alt. E Designated Routes Crossing Non-BLM Lands
 - Existing Routes in Alt. A (Preferred) Eliminated by Alt. E
 - STLA - No Access Under Alternative E

Trust Land Road Access
Vernal BLM RMP Alternative E
Map Scale: 1:50,000
Map Date: 10/2003
Map Author: BLM/Vernal RMP
Map Reviewer: BLM/Vernal RMP
Map Approval: BLM/Vernal RMP
Map Distribution: BLM/Vernal RMP
Map Contact: BLM/Vernal RMP
Map Notes: This map was prepared for the BLM/Vernal RMP. It is not to be used for any other purpose without the written permission of the BLM/Vernal RMP. The BLM/Vernal RMP is not responsible for any errors or omissions in this map.

